ENGINEERING NEWS-RECORD

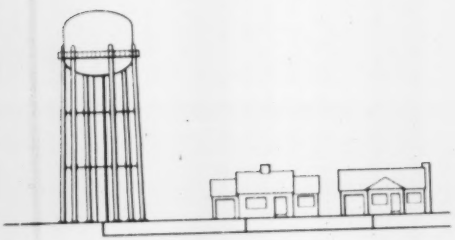
A McGRAW-HILL PUBLICATION

better water service for **ANY** *community*

LARGE or Small

The size of a community has no relation to the manner in which a Horton elevated water tank helps improve water service. There's only one real difference between the tank in a small town and in a big city neighbor. The tank in the big city usually has a greater capacity. Three basic advantages, common to both large and small Horton elevated tanks, are available to the largest metropolis or the smallest village alike. These advantages are maintenance of a more uniform water pressure throughout the distribution system, a reduction in pumping cost, and a reliable reserve that helps pumping equipment meet peak loads.

Our nearest office will supply estimating figures on the cost of an elevated tank to consulting engineers and municipal officials.



The above sketch shows how a Horton elevated tank furnishes gravity water pressure to a community. Typical examples of how a Horton tank provides better water service are:

- **Opelika, Alabama** (population 9,000). Water pressure in the distribution system varied from 60 lbs. to 30 lbs. per sq. in. before a 1,000,000 gal. Horton elevated tank was erected. Now the pressure is maintained at approximately 60 lbs.
- **Columbia, Missouri** (population 10,000). The 1,000,000 gal. Horton elevated tank has sufficient capacity so that high-service pumps may be shut down during a 3-to-4 hour period in the evening when the peak load is on the municipal power plant. This tank is refilled during off peak periods, reducing power costs.
- **Washington D. C.** (population 905,000). A 2,000,000 gal. Horton elevated tank provides a reserve of water independent of pumping to supply increasing consumption in a rapidly expanding demand area and to relieve low-service suction of peak demand withdrawals for high service pumping.

Above: 500,000-gal. Horton ellipsoidal-bottom water tank 100 ft. to bottom at West Memphis, Arkansas, (population 3,327). Horton elevated tanks are built in standard capacities from 5,000 to 2,000,000 gallons. All municipal installations are built in accordance with American Water Works Association specifications.

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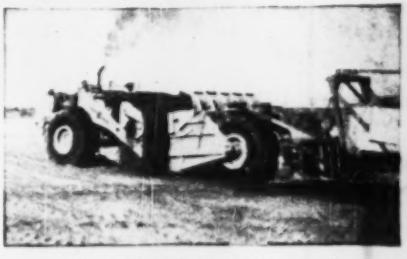
LaPLANT-CHOATE

. . . the sure sign of more and more profitable earthmoving jobs!

HERE'S the sure sign of the extra yardage production that gets the job done faster and at lower cost on more and more jobs. Watch LPC Motor Scrapers in action . . . talk to the men who own them. Then ask your LPC distributor to explain *all* the big-production, high-profit features. LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa—LaPlant-Choate Sales and Service, 1022 77th Ave., Oakland, Calif.



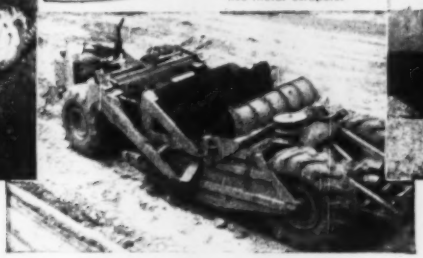
LAPLANT-CHOATE One of the ways J. Robert Baxley uses Motor Scrapers for coal stripping at Mt. Carmel, Pa.

LAPLANT-CHOATE Brown Construction Co. is piling up high yardage totals at Deming, New Mexico.

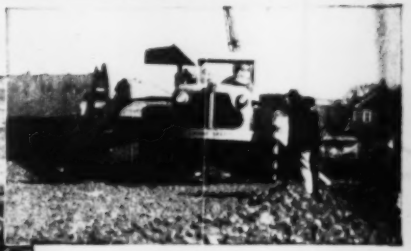
LAPLANT-CHOATE Henry Doelger picks 4 Motor Scrapers to move 12 million yards of sand at Westlake, Calif.

LAPLANT-CHOATE Two LPC Motor Scrapers are working for Bayer & Mingolla on the Route 2 by-pass, Leominster, Mass.

LAPLANT-CHOATE Four LPC Motor Scrapers are speeding operations on the Benbrook Dam for List & Clark, Ft. Worth, Texas.



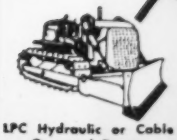
LAPLANT-CHOATE For the Burlington Railroad relocation project at Chillicothe, Mo., Perry McGlone uses five Motor Scrapers.



LAPLANT-CHOATE Patterson Construction Company has three units working on the Pennsylvania Turnpike at Steelton, Pa.

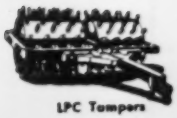
LaPLANT-CHOATE

LPC TW-300 Motor Wagons



LPC Hydraulic or Cable Operated Dozers

LPC Rippers



LPC Tampers

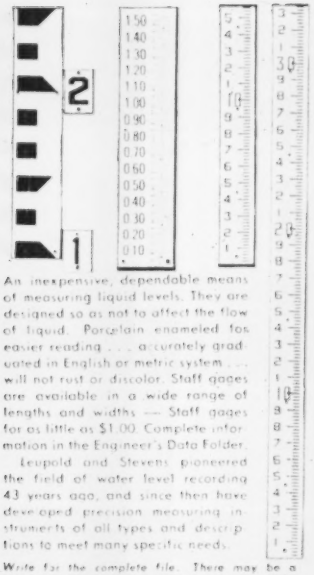
ENGINEER'S FILE ON HYDROGRAPHIC INSTRUMENTS

STEVENS
HYDROGRAPHIC INSTRUMENTS

A wide range of precision measuring instruments to record and indicate head, flow, and totalize flow; for waterworks, sewerage, irrigation and industrial uses. New, low cost methods of liquid level recording.

These methods and instruments for all liquid measuring problems are listed in a complete Engineer's Data folder for your convenience. This information folder is FREE and can be had by filling in the coupon below. The folder includes data on instruments to record fluctuations of liquids in oil production, stream gaging, deep wells, sewage, irrigation, etc., both accurately and economically.

STAFF GAGES



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ENGINEERING NEWS-RECORD

Volume 144 JUNE 1, 1950 No. 22

WALDO G. BOWMAN
Editor

FEATURES IN THIS ISSUE

Truck Terminals Reduce Handling Costs 32

How to Design a Swimming Pool ..... P. M. Holmes 34

Cheap Model Helps Field Men Understand Job 37

Bank Financing of Equipment ..... E. F. H. Bennett 38

Australia's Welded Highway Bridges ..... V. Karnalsky 39

Holmes Roll on the Assembly Line 42

Air in Earthfills Assures Stability ..... L. R. Hallett 44

Perspective: Letter from Winnipeg 10

DEPARTMENTS

Construction Week ..... 17 Municipal Affairs 54

Construction Trends ..... 19 Men and Jobs 58

Editorials ..... 21 Education and Research 60

Newsmaps of the Week ..... 23 Labor and Arbitration 61

News in Legal Decisions ..... 45 Obituaries 62

Reader Comment ..... 46 Unit Prices 63

Developments Ahead ..... 48 Construction Reports 66

New Products 88

Number of copies of this issue printed, 47,881

Managing Editor ... Associate Editors ... Assistant Editors ... Staff Assistants ... Business News ... Contributing Editor ... Domestic News Bureau ... Foreign News Bureaus ...

Publisher

B.F.Goodrich

ALL-NYLON tire record:

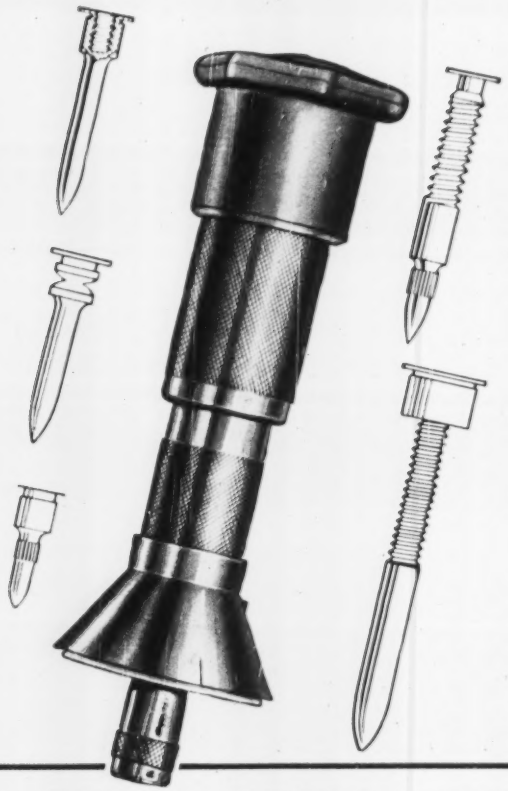
no blowouts, no bruise breaks, no flex breaks!

THE B.F.Goodrich ALL-NYLON tire is proving successful on construction projects all over the country. The record speaks for itself—up to now, no blowouts, no bruise breaks, no flex breaks! And that includes severe operating conditions on jobs where flex and bruise failures formerly were common.

Along with nylon, BFG uses weftless construction; no cross-threads in tire plies to hamper cord action and allow some cords to stretch out. Therefore, tire growth is reduced—tires last longer.

Nylon tires always provide big savings on construction projects, in quarry and other operations where heavy loads and rough terrain have made tire costs high.

The new, all-nylon construction is typical of the continuous improvements being made in tires by B.F.Goodrich. Long ago, BFG engineers developed special types of tires for construction and other off-the-road service. For more information on the way B.F. Goodrich tires can do more work and save you money, call your BFG dealer—or write directly to *The B.F.Goodrich Company, Akron, Ohio.*



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PIONEER IN POWDER-ACTUATED FASTENING

NEWS BRIEFS

Take it easy The brand new $27,000,000 Mystic River Bridge isn't as crowded as city officials of Chelsea, Mass., told the state. The city, its leaders said, can't stand alone much longer against the terrific impact of the traffic the bridge dumps on its narrow streets. State aid is requested.

California Needs YOU Los Angeles wants the finest possible help to operate Hyperion, its new, $41,000,000, activated sludge sewage treatment plant. It went into partial operation May 15th. Applications from experienced people covering education and experience should go to the Civil Service Commission, Room 5, City Hall, Los Angeles, 12. Examinations ordinarily held there will be conducted elsewhere for specialties in which a personnel shortage exists.

Doesn't Seem Possible North Carolina figures its rural roads may become more dangerous now that they're being paved. So it's undertaken the computation of hazard ratings for its 4,000 rural grade crossings. Installation of safety devices will be governed by the ratings.

Boston Parking Off-street parking plans in Boston call for expenditure of $8,000,000 in the next year and one half for establishment of four downtown lots. First municipal space will be opened soon at a cost of $425,000 for a commodity 400 vehicles.

AGC Won't Like It Virginia plans to start its done thing $7,500 miles of road during the next year. Half of it is to be done by contract, half by force account. About 15% of the state's mileage is included.

Action in Philadelphia City officials have approved a $35,000,000 loan for the terminal building at Philadelphia's International Airport. Contracts for the structure have been awarded, totaling more than $7,000,000. Of the loan, $2,850,000 is for other municipal programs.

Swords Into Plowshares Note Permanente Cement Co. of Cupertino, Calif., has signed a contract with the U.S. Navy to supply 1,000,000 bbl. of cement for the Navy's concrete aircraft carrier at Alameda. Cement will be shipped in by freighter from Cupertino. The U.S. will overcome the 2,000 mile transportation to get the right cement.

Won't Know the Place Engineers

Before you buy

a diesel engine

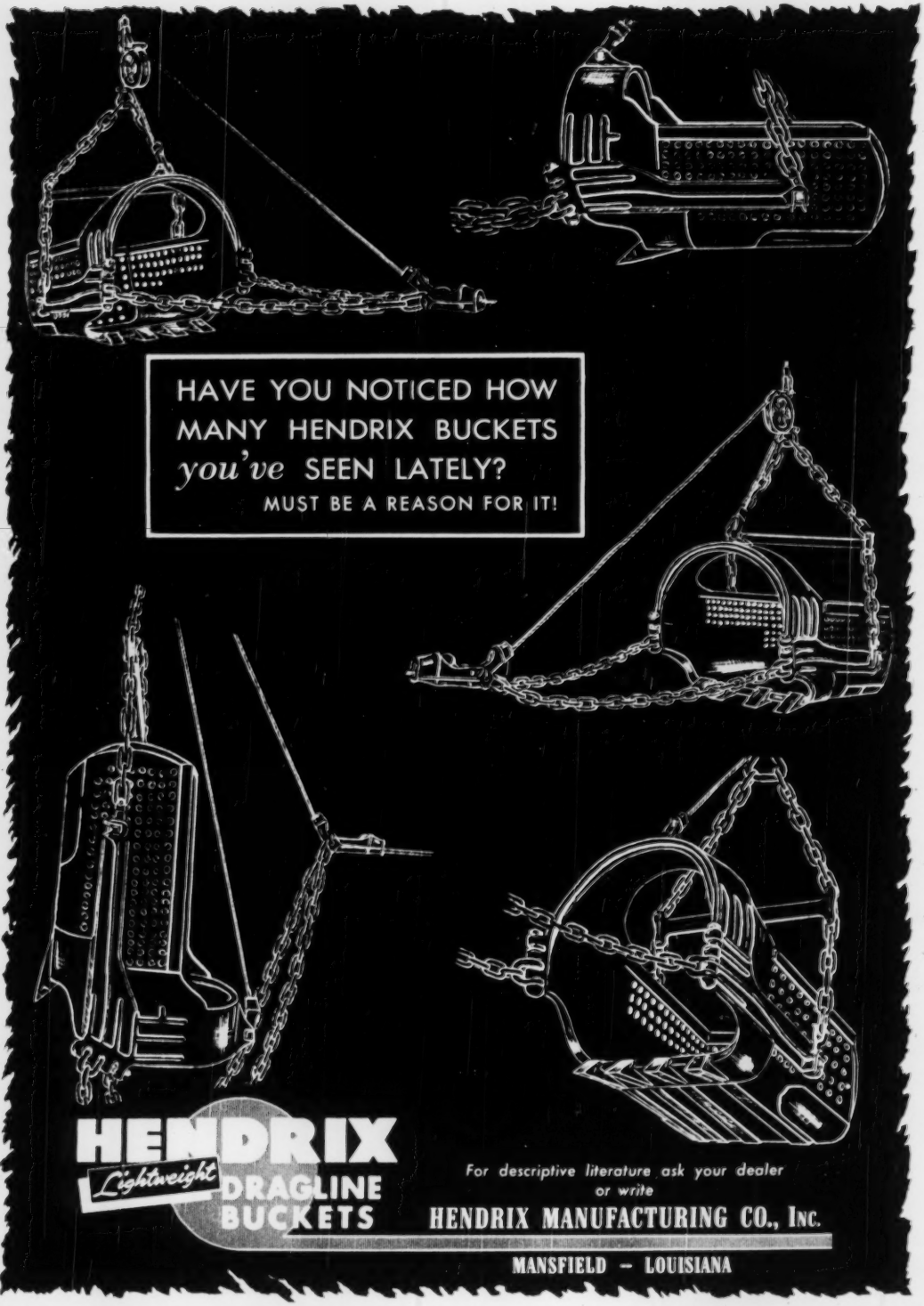
...be sure and read this booklet!

A sound basis of comparison is essential to the selection of the proper diesel engine to meet your power requirements. And that's just what the booklet *"10 Questions to Ask a Diesel Engine Salesman"* gives you. If you want economy, dependability and long engine life this booklet will show you what to look for in a diesel engine.

In addition, the *"10 Questions"* booklet describes fully the Murphy Diesel line of heavy duty "true" diesel engines, giving design details and basic specifications. No diesel power user or prospective diesel power user should be without this helpful 28-page booklet. Write for your copy, mentioning your company affiliation and position.

MURPHY DIESEL COMPANY
5311 W. Burnham St., Milwaukee 14, Wisconsin

Heavy duty power
for construction
Murphy Diesel Engines and Power Units for construction, 90 to 220 H.P. Generator Sets, 60 to 133 K.W.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MANSFIELD — LOUISIANA

Valley's General Stats. Authority has earmarked $140 million for public improvements during its first year of existence. It's let contracts for $30,000,000 of that. Most of it's for mental hospitals.

Any In?—"Danger! 97 bridges out next 20 miles." That's a sign which could be found near Niland, Calif., before contractors began work on a job they're just about to complete on Route 111. In addition to giving the bridge builders a workout, the new road will save 45 miles.

Frozen Assets—North Carolina has saved between $2,500,000 and $5,000,000 on its public building program as a result of bids below estimates and appropriations.

Same Problem in New York—Arizona's Salt River Valley Water Users Association will spend between $1,200,000 and $1,400,000 in its next fiscal year to curtail water loss wherever possible. The program includes more than 6,000 leakproof gates in minor irrigation ditches. "There's another $750,000 going into system rehabilitation this fiscal year. Casings are being pulled on 60 wells, bottom sand removed and motors reconditioned.

It's a Problem—Washington and Oregon highway departments are studying the location for a new highway bridge across the Columbia River between Portland and Vancouver. Actual construction isn't likely for some years. Most likely location: Near the present Interstate Bridge, according to a Washington department district engineer. Cost: At least $6,000,000.

Nice Guy!—Shoemaker Vincent Mutinich, a Czech emigrant, 57 years ago, sold a 11 mi. x 4,000 ft. property to Volney, Calif., Seeking to expand his shop, he found the city hall occupied that much of his lot. City officials offered substantially more than he'd paid for his lot; Mutinich sold for $1.

Everybody's Doing It—Seattle faces the construction of a new water supply line along the east shore of Lake Washington to match continuing northward growth of the metropolitan area. Before that job, estimated at $6,000,000, is undertaken, there'll be a reservoir of 20,000,000 gal. capacity built in the northwest section. Requirements last year of the area north of the city limits were double those of the same area in 1948. The water line job, when it comes, probably will force the water department into its first issue of revenue bonds since 1938, experts believe.

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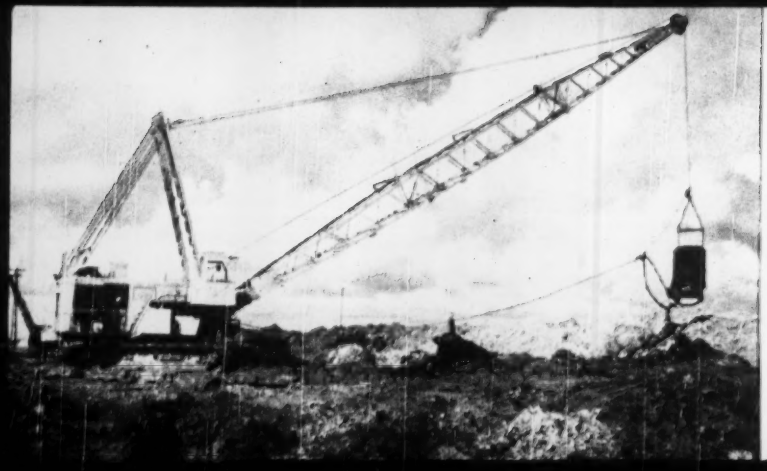
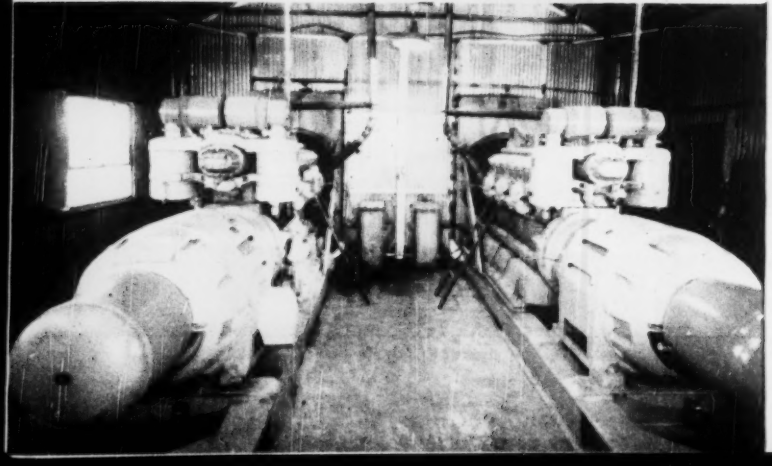


A D386 "Cat" Engine powers this Manitowoc dragline, with 6-yd. bucket and 120-ft. boom, building levee on Galveston Bay. Owned by McGinnes Bros. Construction Co., Houston, Texas.

"Cat" Engines

BUILT

This crushing plant, owned by Arthur R. Alvis, Butler, Mo., has a "Caterpillar" D375 Engine driving a Universal pulverizer. Capacity, 125 tons of road rock per hour.



Two "Cat" D397 Electric Sets, each with capacity of 314 kw., furnish light and power for Cedar Bluff Dam construction job. Contractors, Lytle-Amis & San Orr, Ellis, Kans.

BACK of the high preference for "Caterpillar" power on construction jobs is a long experience of profitable operation.

Construction men know they can depend on steady, day-in-day-out performance from "Cat" Engines and Electric Sets. And they know they'll get 24-hour service—anywhere—from "Caterpillar" dealers.

The right power for every type of job is now available in the complete "Caterpillar" line. There are ten Engines, ranging in size up to 500 hp. (maximum), and ten Electric Sets, up to 314 kw. (12-hour duty).

Over 150 manufacturers make "Cat" Engines available as power for their equipment. They know that quality power adds to the performance of their product —gives greater satisfaction to the user.

When you order new construction equipment, specify "Cat" Diesel power. Your "Caterpillar" dealer will be glad to *show* you how the big yellow machines will meet your requirements.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

FOR CONSTRUCTION MEN

LOOK UNDER THE HIDE

for the quality that pays off in performance!

The built-in quality of "Caterpillar" Diesel Engines doesn't show on the outside—but it shows up in performance. Just take a few examples of the hundreds of hidden quality features that give "Cat" Diesels their long life and dependability.

Fuel pumps are "Caterpillar"-designed and "Caterpillar"-built. Made of the cleanest high-chromium, high-carbon alloy steel obtainable, the pump plungers and barrels are diamond lapped. Pumps are heat treated to maximum hardness to give users thousands of hours of trouble-free, economical service. There is an individual pump for each cylinder. Pumps are free from adjustment and interchangeable.

"Caterpillar" intake and exhaust valves are made of highly alloyed, heat-resistant steels. Their ample size and close machining and heat treat specifications have resulted in thousands of hours of trouble-free valve operation. Valve and rocker arm design are matched to reduce wear. Valves in the D397, D386, D375 and D364 Engines have special hard facings on contact surfaces, and have valve rotators and hardened valve seat inserts to reduce seat wear.

The fuel injection valve offers owners maximum simplicity in design. Machined to extremely close limits, these valves are made from the finest quality materials — and are subjected to very detailed hardening processes. Valves are completely interchangeable and are adjustment free. A large single orifice minimizes fouling. With the matched design of valves and precombustion chambers, owners use low-cost, non-premium fuels to get top economy.

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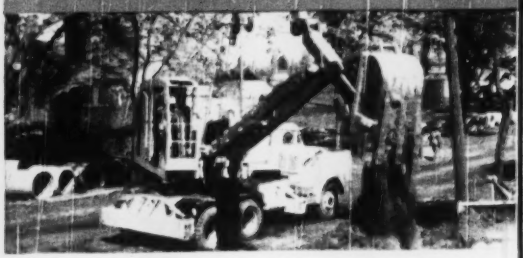
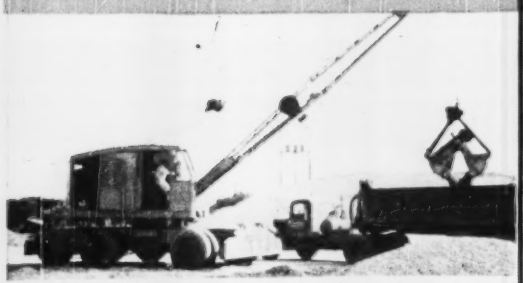


MOBILE TRUCK HOE — for short-duration excavating jobs, you can turn travel time into extra work time with 35 m.p.h. truck-mounted hoe or shovel. ¾-yd. 304 illustrated. ½-yd. 205 also is available.

HEAVY-DUTY DRAGLINE — Extra reach and heavier lift capacity of truck-mounting give the Koehring 304 plenty of operating stability for handling oversize dragline buckets and wide work range.



ONE-MAN CRUISER — With Koehring 304 on cruiser-type mounting, you have economical one-man handling and 4.8 m.p.h. shuttle speed for crane and clamshell. Both work and travel controlled from cab.

FAST-SHUTTLING 304 Cruiser saves time on pipe installations, bridge construction, on docks, around industrial plants, railroad and lumber yards, where machine moves from one location to the next.

Increase LIFT CAPACITY

Use Koehring ON RUBBER . . . .

For setting steel on quick excavations, or anywhere travel time is an important percentage of job duration, it pays to use the Koehring truck-mounted 205 or 304. These mobile, rubber-tired units cut non-productive moving time, roll along at 30 to 35 m.p.h. — get to job fast, start work sooner, move on to next job quicker. No waiting for trailer, no loading and unloading delays, no planking.

304 LIFTS 25 TONS

Next, consider the increase you get in lifting capacities. Koehring 304 Truck Crane safely lifts up to 50,000 lbs. — 11.1 tons more than its crawler rating. The smaller heavy-duty 205 Truck Crane handles 20,000 lbs. — 2¼ tons over crawler capacity.

110-FOOT REACH

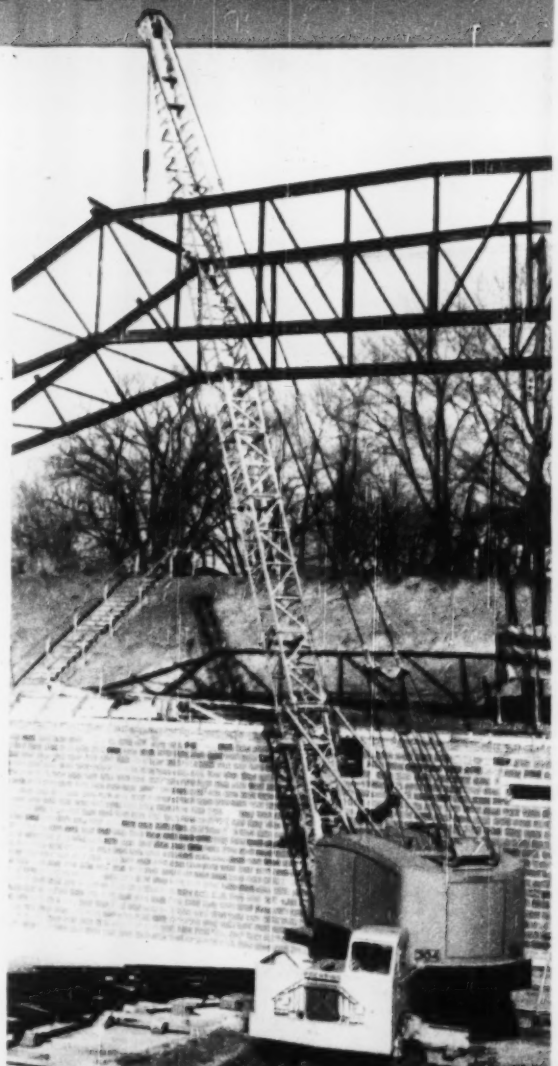
Extra stability of truck mounting also increases boom length. Reach on the 304 steps up from 75 to 110' maximum with jib — and boom on the 205 Truck Crane increases from 50 to 85' with jib. Hinged booms fold back for ample travel clearance, save more time every move.

3 BIG GAINS

Figure what these three big gains — in extra speed, extra capacity, and extra reach — can mean on **your** jobs! Remember, too, both the Koehring truck-mounted 304 and 205 are fully convertible from lift crane to dragline, clamshell, pile driver, shovel and hoe. That extends the speed and mobility to **all** of your materials-handling work.

. . . CHECK THESE KOEHRING PRODUCTS WITH YOUR JOB REQUIREMENTS . . .

Other heavy-duty products in the big Koehring line include: 1½ yd. excavator with 36 ton lift capacity, 2½ yd. with 79 ton lift, 6 yd. Dumptor◯ for high-speed, no-turn shuttle hauling, 2 sizes Twinbatch◯ Pavers — mobile 16 E on rubber tires, and big production 34 E on crawlers. Longitudinal finisher, tilting and non-tilting Construction Mixers up to 4 yds., and Mud-Jacks◯. Your Koehring distributor can give you complete information.

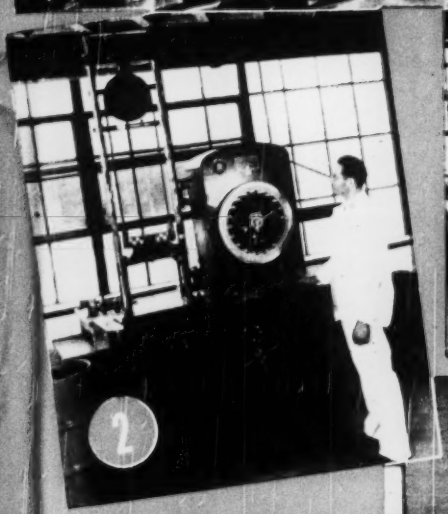


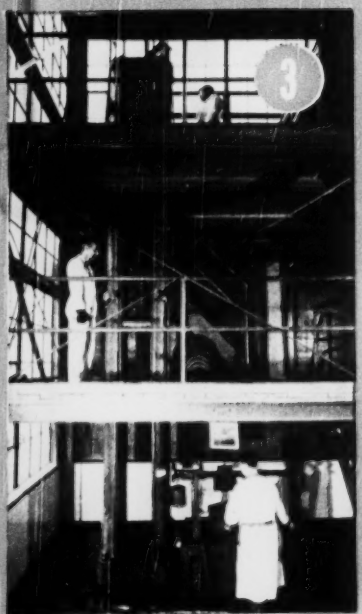
Steady, *safe* operation is assured with independent boom hoist, power-boom lowering, telescopic boom back stops, clutch throw-out boom limit stops on all Koehring Truck Cranes. Self-adjusting main clutches make tension changes automatically. Mechanical booster clutch on 304 reduces normal lever pull more than 50% for the operator and retains "feel" of load.

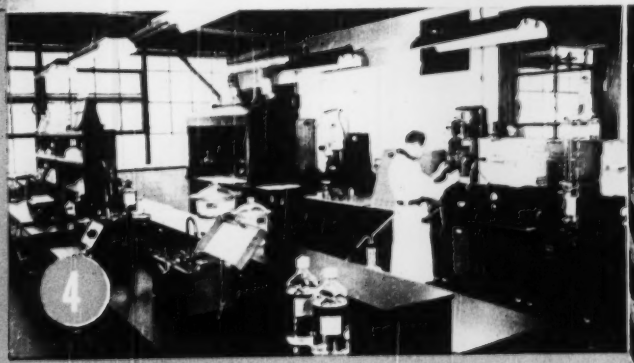
KOEHRING HEAVY DUTY

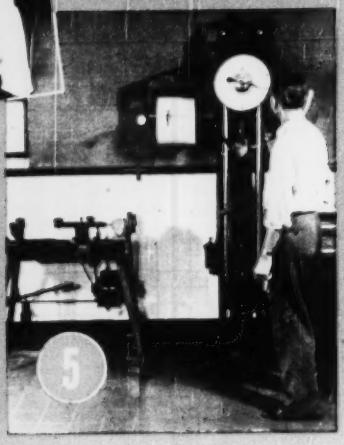
KOEHRING COMPANY
Milwaukee 16, Wisconsin
SUBSIDIARIES: PARSONS • KWIK-MIX • JOHNSON

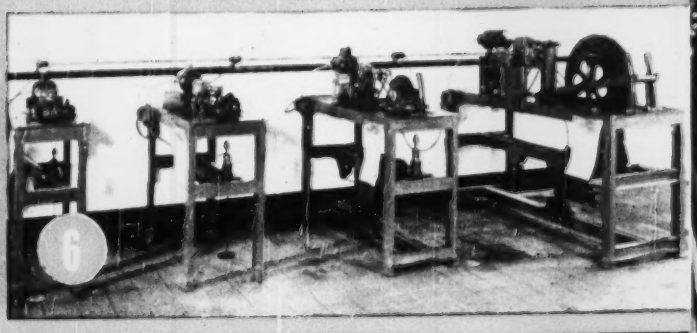
how

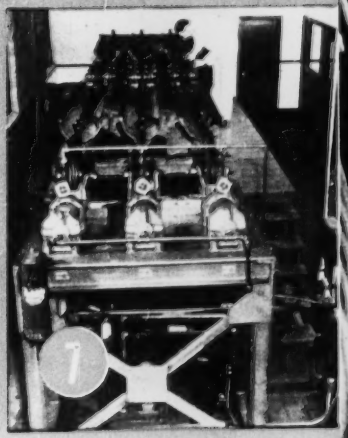












Wire Rope Problems are Studied in the Field... and Whipped in Union Wire's Outstanding Research Laboratory by Technical Experts

Not content to sit back and make wire rope as it has always been made—just because it has always been made that way—

Union Wire Rope engineers continuously study problems in the field—bring them into the outstanding Union Wire Rope laboratory—and keep them under constant research until whipped and tested in the field.

The result is a growing line of new wire rope constructions, designed for specific uses, covered by the simplest kind of specifications and identified by the trademarked name TUFFY. Here are some of the steps taken to pre-determine Tuffy toughness that assures longer life.

1. Microstructure Tester. Under powerful magnification, Union Wire metallurgists examine the microstructure of the steel in rods and wires to see that rigid specifications are met and maintained in processing.

2. Static Flexibility Tester. The demand of machinery engineers toward smaller sheaves and higher speed made it necessary for Union Wire Rope Engineers to adapt this standard machine in order to test static flexibility.

3. Rope Testing Machine. This 3-story high machine is designed to test and record the breaking strength of the rope when finished and ready for the customer.

4. Chemical Analysis Laboratory. Steel for Union Wire Rope is made to rigid specifications. Here rods and wires are chemically analyzed to make certain that the correct combinations of carbon, manganese, etc., are kept under control.

5. Wire Tensile & Torsion Tester. In tension and under torsion, this machine tests wires to see that they measure up to the extraordinary high level of strength and toughness mandatory in Union Wire Rope.

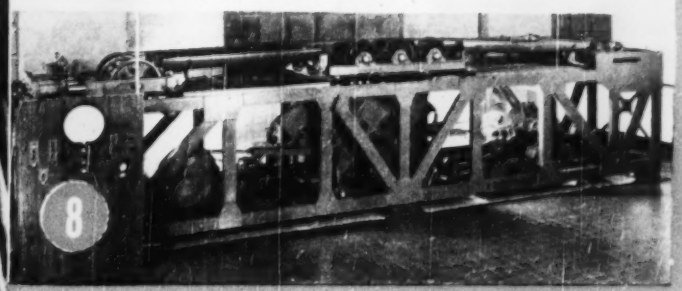
6. Wire Fatigue Testers. The fatigue strength of wire rope is the sum total of the fatigue strength of the wires in its construction. Here, the wires in tension and bending are tested for fatigue strength.

Wire Rope Accelerated Fatigue Tester—Only One of Its Type In Captivity

7. Top view—shows simultaneous testing of three different wire rope constructions. Here, in days, ropes are subjected to punishment equal to weeks or months of hard service.

8. Side view. Designed by Union Wire Rope Engineers, this accelerated fatigue tester is equipped with sheaves from 8" to 24" permitting application of any bending strain. Tensile loads up to 12,000 lbs. are applied. Thus wire rope life under toughest fatigue conditions is pre-determined.

After Union Wire Rope designs pass all of the exhaustive testing imposed by this array of highly specialized laboratory equipment and technical experts, Union Wire Rope engineers submit it to the final test. In the field, under actual working conditions, they confirm the longer life expectancy indicated by laboratory findings and determine proper application which in itself is vitally important.



Tuffy FAMILY SMASH HIT in Construction Industry

Fathered by necessity, conceived in research—the distinguished Tuffy family of wire rope and braided wire fabric constructions have won the popular acclaim of users throughout the construction industry on the dollars and cents basis of better performance. By running your own comparative tests you, too, will be convinced that Tuffy gives you the ultimate low cost wire rope.

Put Tuffy Draglines to any test. Watch them come out on top with unequaled money-saving records. No more complicated specifications. Just the length, size and name Tuffy. That's all.

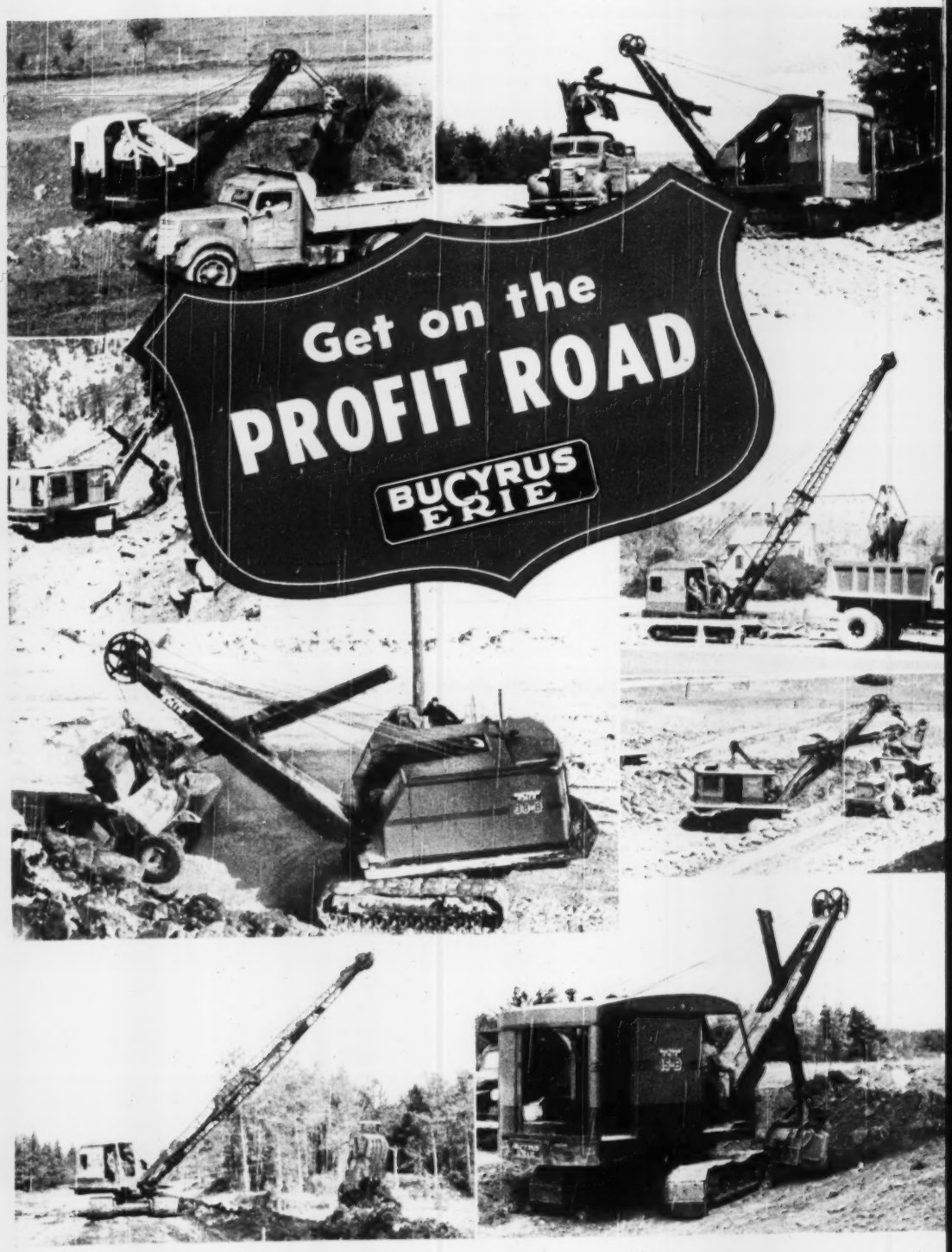
Test Tuffy's ability to handle extra yardage. You will change to Tuffy reels on your whole fleet. The name Tuffy, the diameter and the length—that's how simple it is to buy scraper rope for new yardage records.

An entirely different patented, interlaced wire fabric construction gives Tuffy extraordinary flexibility and stamina. Proof tested to twice working load. Ten types—factory fitted.

Write For
Illustrated Folders
on Tuffy
Draglines . . . Slings
Scraper Rope

union Wire Rope corporation

2228 Manchester Ave. Kansas City 3, Mo.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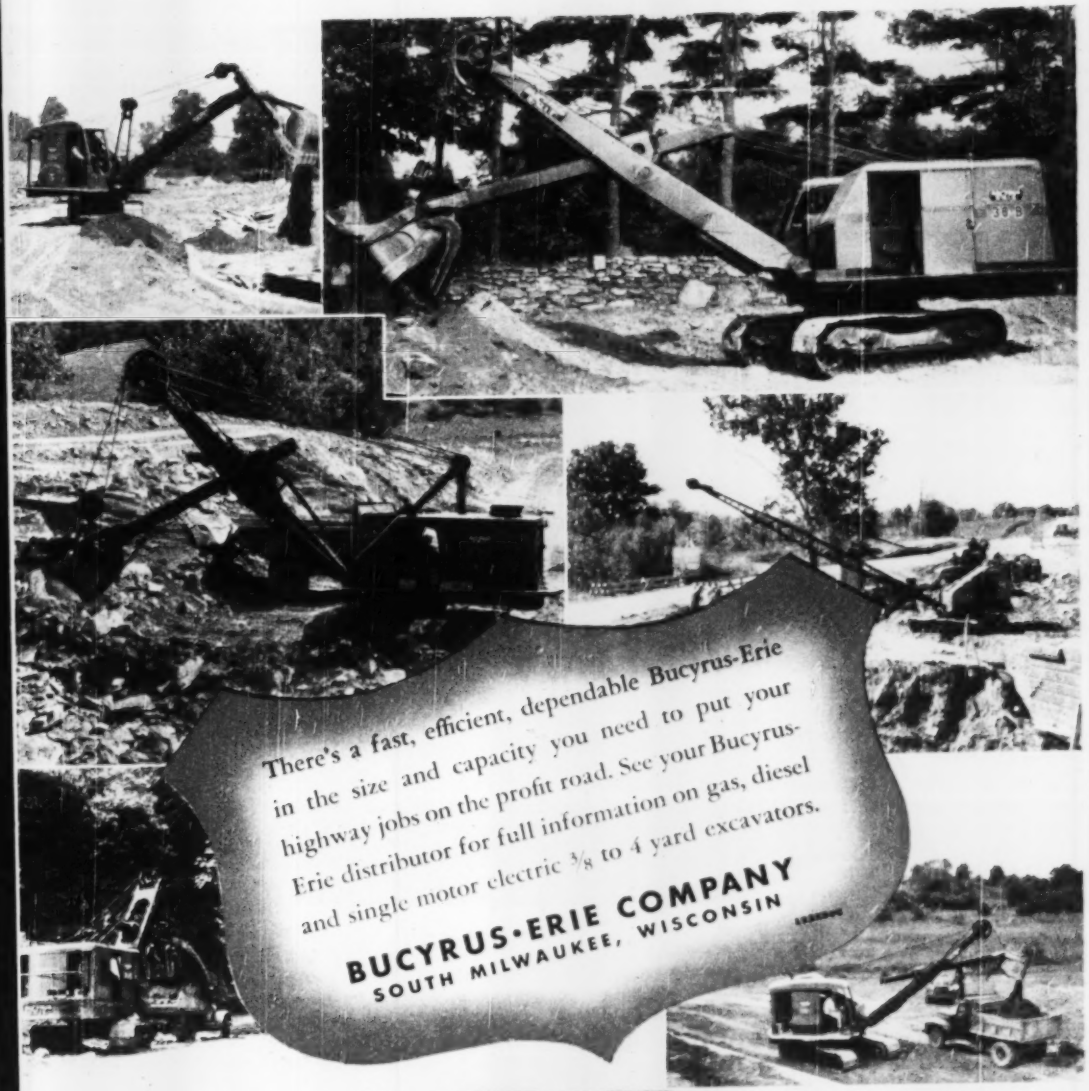
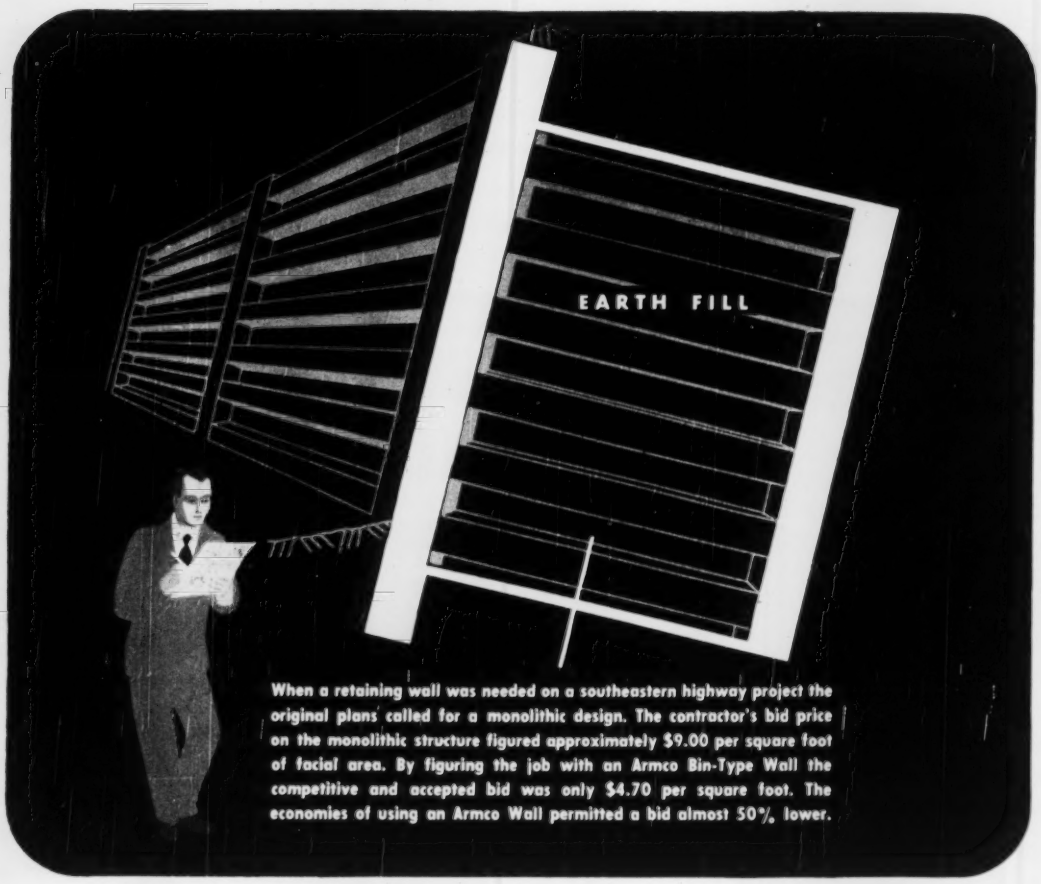
PROFIT ROAD
BUCYRUS
ERIE



There's a fast, efficient, dependable Bucyrus-Erie in the size and capacity you need to put your highway jobs on the profit road. See your Bucyrus-Erie distributor for full information on gas, diesel and single motor electric 3/8 to 4 yard excavators.

BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN



When a retaining wall was needed on a southeastern highway project the original plans called for a monolithic design. The contractor's bid price on the monolithic structure figured approximately $9.00 per square foot of facial area. By figuring the job with an Armco Bin-Type Wall the competitive and accepted bid was only $4.70 per square foot. The economies of using an Armco Wall permitted a bid almost 50% lower.

Contractor Cuts 50% on Retaining Wall Bid

When construction projects call for a retaining wall experienced contractors know a ready answer. They can bid lower and make a good profit with an Armco Bin-Type Wall.

Savings start immediately. Less material needs to be transported to the job site and the lightweight metal sections are economical to handle and haul.

Armco Walls are so easy to erect that unskilled labor can do it in any season. Little excavation is the rule. Usually you only excavate for the outline of the bins. Earth in the center doesn't have to be disturbed. Backfilling is done as the job progresses and the hazard of undermining adjacent ground during construction is arrested. There are no forms to build, no delay for curing. The work moves fast and labor costs are low.

Keep profit up and bids low by figuring that next job with an Armco Retaining Wall. You'll also find other Armco products economical to handle and install. These include MULTI-PLATE for large drainage structures and corrugated metal pipe for drainage and subdrainage work. Write for data on your specific needs. Armco Drainage & Metal Products, Inc., 4160 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation.

Export: The Armco International Corporation

ARMCO RETAINING WALLS

THE CONSTRUCTION WEEK

DYNAMITE UNDELIVERED—Contained in the explosives that blew up at South Amboy, N. J. last week was 45 tons of dynamite for Morrison-Knudsen's Afghanistan construction operations. According to the rules, however, it was not M-K's dynamite until it was aboard ship. The blowup occurred while the explosive was being barged out. Such dynamite shipments have been made periodically before, but so far as is known, this was the first time that the forwarding company had decided to mix the dynamite with hand-grenades and anti-personnel mines.

SCOLDING—President Truman didn't much like it, but he signed the $1.7 billion (authorization, not cash) Flood Control-Rivers and Harbors bill. Then he took occasion to scold the lawmakers for their piecemeal approach to resources development legislation. Said the President: Other agencies besides the Army Engineers should share responsibility for comprehensive studies such as are set up in the law for the White, Red and Arkansas rivers, and for hydro investigations in New England.

PRACTICE VS. PREACHMENT—Incidentally, Congress bypassed its own declared policy on new projects in the Flood Control-Rivers and Harbors act. Written into the law is a provision that no project be authorized until Congress receives a report from the Chief of Engineers. President Truman pointed out that the act authorizes several projects—total estimated cost about $12,000,000—for which no reports had yet reached Congress.

NEW SANITARY EQUIPMENT—Geiger counters might become standard equipment for sanitary engineers, if plans of Westchester County (N.Y.) are carried out. Engineers plan the injection of harmless radioactive material into sewage effluent. Then they'll use Geiger counters to follow the material and determine whether it reaches bathing beaches along Long Island Sound. William A. Holla, county health commissioner, figures it'll take two years to conduct the experiment—one year to find the right radioactive material, one to follow the particles.

WHO'S BUYING?—Noting "growing tendencies" of manufacturers to cut equipment and materials prices to government agencies, (and with a particular eye on North Carolina) Carolinas Branch AGC members weigh in with strong objections. A resolution approved at Charlotte strongly condemned the practice, pointed out it can hurt the private construction industry. What the contractors had in mind was North Carolina's recent purchase of $5,000,000 worth of road machinery, and an additional purchase (May 17) of $150,000 more. Contractors say that some manufacturers are cutting their prices as much as 30 percent to governmental agencies.

BOCA HAS CODE—After nearly five years of struggle, the Building Officials Conference of America will bring out the first of its two model building codes as a major feature of a four-day annual meeting at Indianapolis, June 5-8. First will be BOCA's Abridged Building Code—designed specifically for the use of smaller communities. The Basic Code—a much more voluminous matter—is expected to be printed and ready for distribution about mid-July. Publication was financed by the Building Officials Foundation.

LOCAL FIGHT—It hasn't yet made much of a dent in the overall program, but the National Association of Real Estate Boards is having some success in its fight on public housing. The strategy is simple enough: (1) Take it over the head of the city council to the voters; (2) Do it where most of the voters are property owners, who can be impressed with the tax burden of public housing. Following these tactics (though there's no general pattern—each battle being fought on local lines) NAREB has counted a number of victories—notably Seattle, Racine, Wis., Grand Rapids, Mich., Portland, Ore., Lincoln, Neb., St. Petersburg, Fla. It doesn't work too well in the really big centers—New York, Chicago, Los Angeles, Boston, Omaha, among them. And, to date, Public Housing Administration, has granted 550 applications to local housing authorities, totaling 293,000 housing units. (see p 24).

FLEMING HEADS TRANSPORTATION—President Truman persuaded Maj. Gen. Philip B. Fleming to take the new "reorganization" post of Undersecretary of Commerce for Transportation. Senate confirmation is regarded as routine for the general, who has won many friends and made few enemies during his tenure as FWA administrator and later as Maritime Commission chairman. In his new job, he takes Public Roads back under his wing, much to his own satisfaction and that of BPR. He retains administrative supervision over the new Maritime Board and Maritime Administration—replacing the old Maritime Commission—and adds to his responsibilities two other transportation agencies of the Commerce Department—the Civil Aeronautics Administration and the Inland Waterways Corp.

KNOW ABOUT *NEW* "FLEETWELD 72" for high speed production welding?

• **Welds Faster.** Operates efficiently over a wider current range than conventional E-6012 electrodes. Operates best at currents substantially above conventional E-6012 rods . . . and without overheating.

• **Welds Easier.** Unique arc characteristics assure proper root penetration on fillet welds without sacrificing speed . . . minimizes the danger of cutting away the top edge on lap welds (Fig. 2).

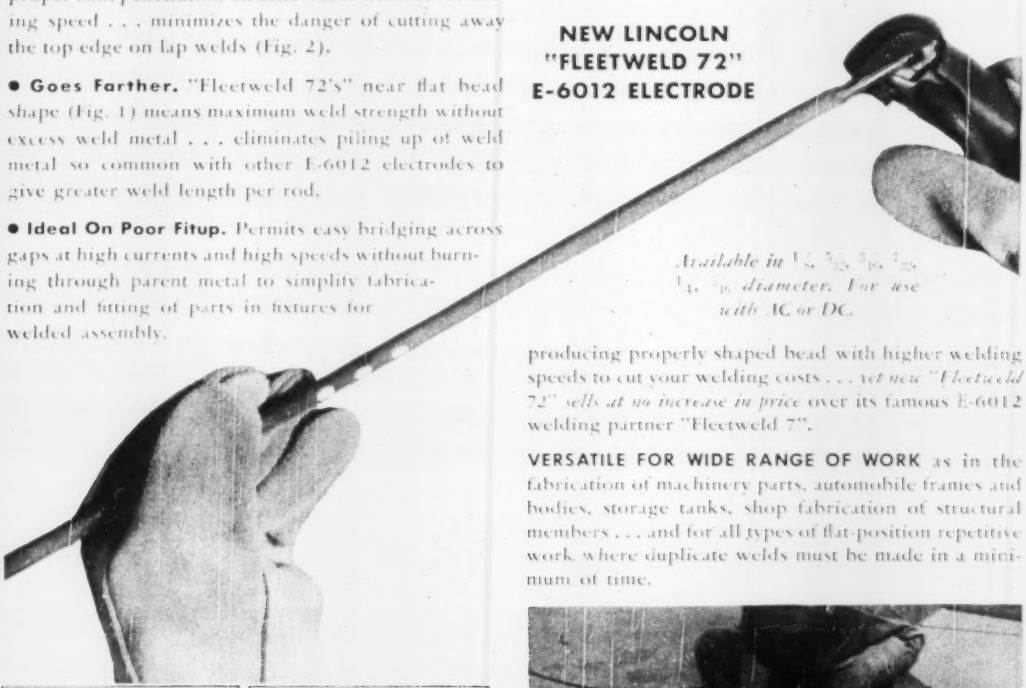
• **Goes Farther.** "Fleetweld 72's" near flat bead shape (Fig. 1) means maximum weld strength without excess weld metal . . . eliminates piling up of weld metal so common with other E-6012 electrodes to give greater weld length per rod.

• **Ideal On Poor Fitup.** Permits easy bridging across gaps at high currents and high speeds without burning through parent metal to simplify fabrication and fitting of parts in fixtures for welded assembly.

• **Needs Less Cleaning.** Smooth, uniform operation over broader current range minimizes spatter . . . On many types of work, slag is practically self-cleaning.

• **Premium Performance At No Extra Cost.** New "Fleetweld 72" combines the benefits of greater ease in producing properly shaped bead with higher welding speeds to cut your welding costs . . . *yet new "Fleetweld 72" sells at no increase in price* over its famous E-6012 welding partner "Fleetweld 7".

NEW LINCOLN "FLEETWELD 72" E-6012 ELECTRODE



Available in $\frac{1}{16}$, $\frac{5}{32}$, $\frac{3}{16}$, $\frac{7}{32}$, $\frac{1}{4}$, $\frac{5}{16}$ *diameter. For use with AC or DC.*

VERSATILE FOR WIDE RANGE OF WORK as in the fabrication of machinery parts, automobile frames and bodies, storage tanks, shop fabrication of structural members . . . and for all types of flat-position repetitive work where duplicate welds must be made in a minimum of time.

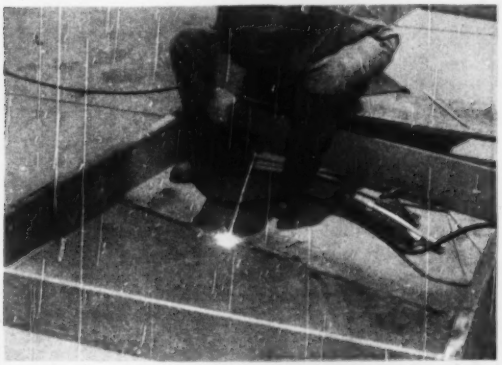


Fig. 1. Proper Weld Metal with "Fleetweld 72's" near flat bead means greater "mileage" from each electrode.

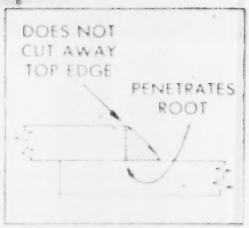


Fig. 2 Prevents Cutting Away of top on lap welds . . . weld flows up to edge without undercut at high speed. Prevents piling up of metal.

GET THE FACTS

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CONSTRUCTION TRENDS

INDUSTRY INVESTMENT PLANS

	1949 Expenditures	1950 Original Plans	1950 Revised Plans
	(millions of dollars)		
Manufacturing	7,200	6,300	6,845
Chemicals	1,100	1,040	1,100
Petroleum refining	700	580	580
Food	600	585	625
Machinery	530	460	475
Steel	520	445	490
Autos	420	550	740
Textiles	410	360	390
Electrical machinery	200	135	145
Transportation equipment	145	95	100
Other manufacturing	2,575	2,050	2,200
Railroads	1,310	735	970
Electric & Gas Utilities	3,160	3,050	3,000
Other transportation and communication	1,880	1,695	1,775
Mining	750	620	650
Grand total	14,300	12,400	13,240

BUSINESS EXPANDS ITS 1950 PLANS FOR NEW PLANTS AND EQUIPMENT

An upturn in industrial building seems here.

ENR's contract awards on industrial building, while lagging behind the boom in most other types of building, are running 10% ahead of last year.

Now, a recheck of McGraw-Hill's annual survey on "Business Plans for New Plants and Equipment", indicates that the year-and-one-half-old downtrend in business investment is being reversed.

The check was made among leading manufacturing, mining, transportation, and utility companies; it shows that industry now plans to invest 3% more in the last half of 1950 than it did in the first six months. The gain is small. But it is the first upturn in plans for capital expenditures since late 1948.

PLANS 7% BELOW 1949

Capital expenditures in 1950, as planned now, will still be lower than in 1949 by 7%. However, at the start of the year, plans were 13% under the 1949 level. Among major industries, only petroleum and the utilities have not revised their plans upward. The table shows how plans stand now.

The second half of the year will see higher capital expenditures than did the first half in most manufacturing industries. The auto industry shows the biggest increase—it plans to spend 64% more in the next six months than it is spending in the first half. New plants—for automatic transmissions—are a key factor.

Other manufacturing industries plan to spend from 4% to 8% more for new plants and equipment, except for the chemical, transportation equipment, and electrical machinery industries. They are holding expenditures level or dropping them slightly.

Railroads and mining companies will hold their plant and equipment purchases level through the year. Electric and gas utilities, however, are planning to spend 7% less in the second half than in the first. The decline here can be traced largely to a slowdown in electric utilities' construction programs.

STRENGTHENS BUSINESS OUTLOOK

The upturn in industry's investment plans adds strength to the business outlook. At the start of the year, business forecasters had strong doubts about the period after Labor Day, but now business promises to run on at a high level through the year.

Combined with the boom in other kinds of construction, high-level plant and equipment expenditures underwrite general prosperity. The sharp surge in the number of houses started this spring, plus the high level of contracts awarded for heavy construction means that activity in the field will hold at a high level—even if starts and contract awards begin to taper off. Since construction and capital equipment together account for a major part of industrial employment, that helps importantly to hold employment up. And high employment, in turn, promises good general business.

This spring, in fact, is seeing business set many new records—aside from those in construction. The steel industry, almost week by week, has upped ingot tonnage from one new peak to another. And still manufacturers complain that steel was harder to get, for some of them, than it had been in wartime.

A fabulous production pace was set by the auto industry in the weeks after Chrysler employees went back to work. Production hit an annual rate of better than nine million cars and trucks. In addition, the industry expects to keep going at a high level at least until model changeover time in the fall. The widely hailed five-year General Motors agreement means there will be no major break in the rhythm of the assembly lines.

Other lines, notably in home appliances, set new production and sales production and sales records this spring. Refrigerator and vacuum cleaner manufacturers, for example, topped their past records. Television makers, even though sales slowed down late in May, have raised their sights for the year.

The U.S.'s gross national product in the second quarter was running very close to its past highs.

Value of all goods and services produced in the country was estimated at nearly $270 billion—a point reached only once before, in late 1948. But since prices of almost all products have come down markedly since then, the actual physical volume of output was probably at its all-time peak.

In short—both construction and general business go into the summer at a very high level and with prospects bright for the rest of the year.

GENERAL VIEW of operations during early stages of the work. Note tunnel location in center of photo. Small charges of Du Pont Special Gelatin 40% were used in preliminary blasting beneath railroad tracks. Thos. Crimmins Contracting Co., New York, handled this phase of the job.

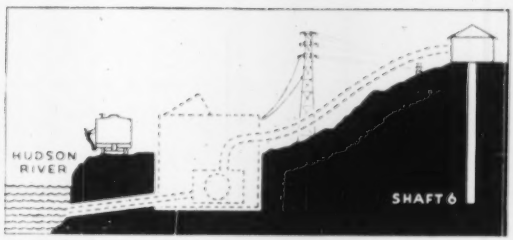
N.Y. "taps" the Hudson

ANOTHER JOB FOR DU PONT DYNAMITES

Contractors chose dependable Du Pont Special Gelatin 40% for all land-blasting operations in constructing an intake tunnel, chlorination plant, pump house and 700-foot pipe line—major sections of a $5,000,000.00 N. Y. Board of Water Supply Project now under way at Chelsea, N. Y., where the Hudson River is being tapped to augment metropolitan New York's water supply.

Hard limestone, capped by a layer of varying thicknesses of shale, proved no obstacle for this versatile, widely used dynamite. Charges of just moderate size (because of proximity of busy railroad tracks) readily broke up the rock for easy removal by truck in driving the tunnel and excavating for building foundations. Du Pont Electric Blasting Caps also are used exclusively.

Whatever your job of construction . . . if large or small, "run of mill" or difficult blasting is required, there are Du Pont explosives and blasting supplies especially suitable for the work. Ask the Du Pont explosives representative in your area for complete information and recommendations. E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Delaware.



DIAGRAMMATIC SKETCH of proposed 120-foot intake tunnel of 8-foot diameter, chlorination plant, pump house and upgrade pipe line to 680-foot Shaft 6 of existing Delaware Aqueduct Water System into which water from Hudson will be delivered. The Fuller Construction Co. and A. J. Dillenbeck, Red Bank, N. J., are general contractors.

DU PONT EXPLOSIVES

Blasting Supplies and Accessories

DU PONT

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Consultants Are Necessary

EVERY SO OFTEN one hears that the profession of consulting engineering is on its last legs. Even consultants themselves have been known to voice such beliefs after seeing some important commission taken over by the staff of some public agency. Such despondency, however, is not justified, and both the record and a demonstrable need for the services of consulting engineers can be cited to prove it.

It is true that the nature of consulting services has changed in some particulars over the years. Principally this may be noted in the fact that there are fewer straight designing jobs today than formerly. The bulk of the road and dam designing, for example, is now done by governmental agencies. But it is also true that the need for and the use of consultants as specialists has in nowise diminished. Indeed new fields have opened up, such as that of soil mechanics, and a re-entry of the consultant into the highway field has accompanied the new interest in toll roads. The great New Jersey Turnpike is almost wholly a consulting engineer operation.

New York City last week afforded a prime example of the reliance that modern engineering practice places on the consultant and of the essential service that he can perform. New York's "various engineering" departments are big and competent enough, if any in the world are, to plan and design engineering work. But New York, historically, has relied upon consultants for guidance on important engineering decisions. The reason is clear, and points up the basic justification of the consultant. City departments and governmental agencies cannot afford to keep specialists on their staffs for only occasional use. Even if they could, the specialists are not in a position to keep up with advances in their specialties. Even if they were, their judgment would benefit from an unbiased outside opinion.

Faced with fundamental and far reaching decisions regarding water supply, New York went to private consulting specialists for advice. Betting the magnitude of the problem they hired not only one but five top ranking specialists to confer and study various alternatives jointly. New York is thus assured of unbiased, authoritative advice based on years of experience with every conceivable type of water supply problem in this country and elsewhere. In no other way than through the services of expert consultants could this assurance be had.

The day of the consulting engineer is not over. It is not even threatened. Keen specialists, kept keen by constant activity in their specialties, are a bulwark against decadent technology and mistaken economies in civil engineering. No doubts on this score should be entertained—in engineering schools, in engineering departments of government or business and, least of all, in the minds of the consultants themselves.

Keeping Contracts Out of Court

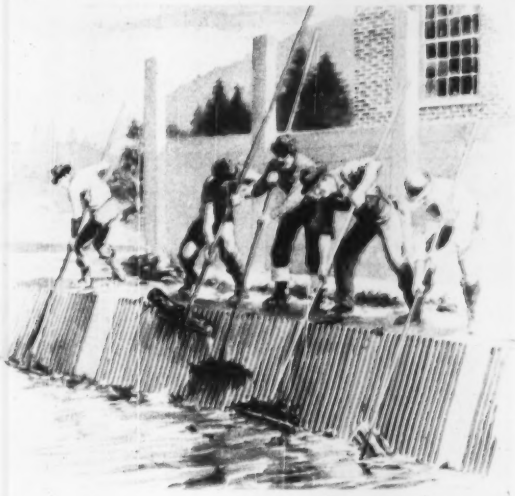
A COMMON CLAUSE in construction contracts is one stating that when disputes arise over requirements of the contract they shall be decided by the architect or engineer, and his finding shall be final. Such a clause has much to commend it. Someone must decide such questions without needless bickering or delay, and the architect or engineer is better qualified to make the decision than is the owner. But the powers thus granted to the engineer or architect are limited, despite the broad wording. If the engineer's finding is unfair to the contractor, is apparently in error, or relates to a provision of the contract that is not clear, the contractor can take it to court for judicial review.

That is such a long established rule of law that it is difficult to understand why some engineers still seek to find ways to get around it. In one contract that found its way into court recently the engineer had added a clause stating that in order to avoid delays, each party to the contract waived his right to court review of disputed questions. But the court declared the clause to be void just the same. The contractor could not be so easily deprived of his fundamental rights even though he had signed the contract containing the waiver.

Engineers are commonly considered as occupying an impartial position between the owner and the contractor. Actually, however, the engineer is not a disinterested party. Usually he writes the contract and so has an interest in seeing that it is not construed in such a way as to add to the cost of the work. Hence, his interpretation of its provisions could be quite different from those of the contractor or of a court of law. That is why courts have consistently refused to approve of contract clauses that attempt to deprive the contractor of his right to an independent review of the engineer's findings, either by a court or an arbitrator.

There is only one way in which court review of the provisions of a contract can be avoided. That is by having both parties agree to refer all disputed questions to an arbitrator whose finding shall be binding. Rulings made by such an arbitrator, the Supreme Court has stated in a recent decision, cannot be set aside by a court. If engineers or architects want to avoid the delays that usually occur when their findings are taken to court, the proper way to attain that end is through agreement on an outside party as arbitrator. Attempts to find wording for the contract that will put their own decisions beyond court review are doomed to failure.

Save COSTS *and* Cut LOSSES *with the* LEONARD Trash Rack Rake



MAKE MONEY by saving it! These pictures tell the story - how back-breaking work is eliminated and Racks kept clearer of leaves and other debris, by the use of this simple device which automatically assures higher turbine or pump performance. Write for Bulletin 146 - now!

If It's Hydraulics - Put It Up to Us!

S. MORGAN SMITH Co.

YORK, PENNA. U.S.A.

ENGINEERING NEWS-RECORD

JUNE 1, 1950 VOL. 144 NO. 22

Material shortages appear as building boom continues

Lumber leads list of supplies hard to get, but steel, lath, block also reported scarce in spotty market—Heavy demands, strikes, open winter seen as causes

ENR Staff Report

A rapid build up of shortages in one major building material—lumber—coupled with increasing reports of tightening supplies of steel, metal lath and pipe, began to appear last week to cloud an otherwise bright construction sky.

The lumber shortage is nationwide, and already has pushed prices well above previous levels. Fir, for example, now averages $101 per M fbm in 15 centers—9% above a month ago, 23% above Jan. 1. Pine 1 x 6's, for example, now average $87 per M fbm in 10 cities—12% above the price of a month ago.

But mounting reports of other materials shortages—most of them prime components for the hoofing housing market—caused U.S. government experts to backtrack on predictions they made only a month ago that all was comparatively well in the construction supply field. Today, the experts aren't too sure. True enough—with the exception of lumber—the shortages are spotty and not in the same materials everywhere. But prices are going up in many items, as materials begin to tighten.

The shortages and the rising prices are already a cause of concern to home builders. A week ago the National Association of Home Builders, at Washington, advised its members to buy their materials now, rather than chance further price increases.

• **Here's why**—Reasons for the change aren't hard to find. Biggest one is the booming home construction field (see also p 24), which has established one new record after another in the first four months of 1950, and promises to keep up the rate. It has grabbed up materials, largely lumber, metal lath and concrete block at an astonishingly fast rate.

Then too, construction generally has been moving at a fast pace, with highway work, heavy factory and plant buildings, bridges, sewage treatment works all moving at record rates.

Thirdly, a prolonged strike against the huge Weyerhauser Lumber Co.—which produces some 10 percent of the U.S. Douglas fir supply—and a large share of other lumber products—has been a heavy contributor.

Fourth, an unusually open winter in the East kept building—and demands—in high gear.

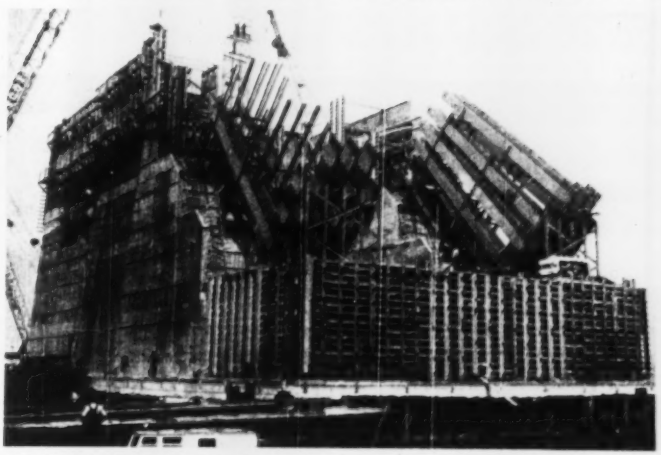
• **Prediction**—A month ago, surveys of manufacturers of building supplies indicated no particular fears of shortages. Producers of gypsum board, nails, roofing and siding, plumbing supplies, hardware and cement felt that—barring major dislocations—there would be no major shortages of materials.

But a month ago exactly, economists on the ENR staff pinned a flag on the possibility of shortages (ENR April 27, p 19) with the statement that with the generally booming condition of the industry, supplies would shortly begin to put a ceiling on rate of construction and that the squeeze would be on housing mostly.

To check its own reports, ENR last week asked its specialist reporters in 20 U.S. cities to look into the supply situation. Their reports confirmed all points except one—no serious shortage of labor seems in prospect.

• **Details**—In detail, the reporters indicated only one general shortage—lumber, both pine and fir. Four of the cities reported tightening in supply of steel—mostly structural shapes; five reported metal lath was difficult to obtain; cinder or concrete block for both were short in three cities; and scattered shortages of other materials—including brick (in St. Louis), steel and vitrified sewer pipe (in Philadelphia and Cleveland), and cement (in Baltimore and Dallas) were also reported.

As to cement, producers in the east and on the west coast declared that shortages—mostly in Texas points—were artificial rather than because of lack of supply. Actually—although normal production backlogs usually built up in slower winter months weren't brought up to quite the usual size—the producers say there isn't any cement shortage. Difficulty is largely traceable, say producers, to the disruption of the industry's pricing practices (including freight cost absorptions) that were caused by recent court actions.



ANCHOR TO EASTWARD—Steel eye bars are being erected in the east anchorage pier of the Delaware Memorial Bridge, near Wilmington. Each of the two groups will hold the 19 strands (each made up of 436 steel wires ⅛-in. dia) of which each 20-in. dia suspension cable will be composed. (See also p 27)

No starts yet in federal-aid housing; prospects for 1950: perhaps 40,000

Public Housing Administration ready to sign contracts with 10 local authorities—Contracts may be advertised thereafter

Federal-aid public housing is the failure of an otherwise booming construction year.

Six months ago, Public Housing Administration reiterated its belief that 112,500 units would be started during 1950 under the 1949 Housing Act. (ENR Nov. 17, p. 29). Three months ago, it halved predictions.

With five months gone, PHA has no units under contract, even though it had assured the House Appropriations Committee that 20,000 would be started by last March 31 and 50,000 by June 30.

By mid-May, PHA was ready to sign definitive loan contracts with 10 local authorities for 3,470 units. Such contracts must be signed before authorities can advertise bids. Based on what he learns from 11 bidding, PHA Administrator John Taylor Egan hopes to get 12,000 to 15,000 units under construction during the third quarter. PHA has no fourth-quarter goal yet, but prospects don't rate any great upsurge in volume then. A gentleman's bet is that local authorities will do well to have 40,000 units started by the year's end.

• **Housing boom anyway.** It ain't cost the failure of the federal-aid program to turn a spade loose the country's most active home-building year. There have been four new record months in private housing contracts this year, on a month-through-April basis.

PHA, however, is still pushing. Homes started by August that's the announced goal of Denver with 1,000 units; Bridgeport, Conn., and other cities with which PHA is now ready to sign. Four other applications have been approved by PHA and forwarded to the President for approval. They total over 4,500 units.

Working back through the tortuous legal process which precedes actual starts under the National Housing Act, current figures show that 250 local housing authorities have signed cooperative agreements with city councils. These agreements, covering 165,000 units, provide for tax exemptions, payments in lieu of taxes and municipal services.

Next step back is the preliminary loan contract whereunder PHA advances funds for planning, investigation and the like. There have been 557 such contracts signed for 248,000 units. These 557 cases were part of 850 for which Presidential approval of the preliminary loan has been obtained.

The 850 approvals, in turn, are from a group of 547 applications covering 290,000 units for which PHA has issued program reservations. And in the most basic category of all are 709 local authorities which have applied for reservations. They cover 475,000 units. That's better than half of the 850,000 low-rent dwelling units which are authorized for construction during a five-year period by the act.

• **Private builders fighting.** Most of these categories would be somewhat higher than they are if private home builders had scored their opposition to public housing when the act passed (ENR June 23, 1949, p. 93). Actually, the anti-public housers stopped much programming under the act (see p. 17) but they've been successful in all cases but one: there they could force a referendum on a local program. That one defeat at the polls was Erie, Pa. Their latest victory: Portland, Ore., which last week duly defeated a program for 2,000 units and beat such opposition as the Young Republicans, Young Democrats, Voters for Democratic Action, the American Legion, VFW, American Veterans Committee and all AFL and CIO union locals.

Private homes, in general, are seeking principal support at the polls anyway from the homeowner. The argument: the homeowner, through both federal income and local real estate taxes, is footing the bill for the public housing tenant, providing him such subsidies as municipal tax exemption, subsidies free rent.

• **Future home volume assured.** With so much work in process, PHA can demonstrate the failure of the federal-aid program to get started so far on any actual home-building may have its benefits. For one thing, the existence of the program just about guarantees that such homes will be built the moment or the day a serious slump in business, for then it would be a ready stage-way special program.

For another, it's possible that if the program had got moving at PHA's originally projected pace, it might have caused local or even material shortages (see p. 25). And it might also have helped push new housing prices up even faster than they're now going in many localities.

Sewer rental charge sought in New York

O'Dwyer asks levy to finance big disposal program—Strong opposition indicated by councilmen

Searching desperately for means of financing its huge sewage disposal program, New York City's Board of Estimate will approve a city sewer-rental charge to property owners.

No formal bill to legalize the charge has as yet been submitted to the city council, which must approve such a measure. Several councilmen indicated last week that the charge would meet stiff opposition when it comes before them.

The city now has under way a $185,000,000 program for construction of new sewage treatment and disposal works, to take care of a concerted drive to clear the waters of New York Harbor and improve the quality of water at nineteen bathing beaches near the city.

Mayor William O'Dwyer—whose administration has been beset by billion-dollar-a-year budgets and the rapidly approaching city debt limit—chose the controversial target for the new $21,000,000 Owl's Head sewage plant in Brooklyn, scheduled for completion in 1951, to announce the Estimate Board's plan.

Assuming bill is forthcoming for the rental proposal, O'Dwyer said that the charge would be roughly one-third of present water bills, and would be added to the water bills for payment. He estimated that the rate would result in an added charge of about 40 cent per month per residence, and would produce revenues for the city totaling about $15,000,000.

The point is made that, since such a rental charge is not legally a tax, the money raised by it can be considered by the city to be income, and the sewage disposal projects could then be considered self-sustaining. Thus, the State Comptroller approves the plan, about 75 percent of the money borrowed by the city for the projects could be exempted from the debt limit this year, and the entire amount in succeeding years.

The entire changeover is expected to reckon hundreds of millions to the disposal program before the city's equally urgent highway construction plans.

Such rental charges have been under consideration by the Board of Estimate since the state legislature authorized them three years ago, O'Dwyer told his audience. He now expects the board to approve the proposal within three weeks, so that the sewer-rental charges may be applied beginning July 1.

Maine Turnpike shows profit, good prospects

Two-year balance sheet shows earned surplus, substantial revenue gains—Fare and volume increases helped

Maine's Turnpike is nicely in the black and its business is improving at a startling rate.

That's the message conveyed by a balance sheet covering its first two years of operation—1948 and 1949—and the first third of 1950. The figures were given ENGINEERING NEWS-RECORD by W. B. Getchell, Jr., executive director of the Maine Turnpike Authority.

The balance sheet shows that opponents of toll roads, who had been using the Maine superhighway as an example of the fallacies of this type of highway, were right at one time in their charges that the road ran a deficit. It did—in 1948—even though it was not a deficit which imperiled bond holders. They were covered in any event since the revenue bond issue which provided construction funds included an item for interest during the first year of operation. Net revenues during 1948 (the road was opened in December, 1947) totalled $449,297, which fell short by $63,203 of covering first year interest.

That deficit, though, was wiped out last year and an earned surplus established. This came about through net revenues of $642,805, a gain of about 43% over those for 1949 and in excess of debt service obligations by $413,805, or almost twice the 1948 deficit. It took an increase in fares to make this 1949 showing, however, along with increased traffic and greater commercial usage.

• **Boom year—1950.** The first four months this year showed a 49% increase over the comparable period of 1949 in net earnings (114% over the comparable period of 1948). Traffic was up only 6%, indicating the effect of the fare increase which was not in effect during the comparable period of 1949. With summer traffic estimated at three times that of winter months, the expectation is that 1950 will show net earnings in excess of those in 1949.

One of the things which helped the authority to better its 1948 record in 1949 was its ability to keep operating expense increases to a small fraction of the increase in gross revenues. It cost the authority $220,498, excluding debt service, to operate the road in 1948, when the gross was $620,735. In 1949, when the gross had climbed to $871,654, it cost the authority $228,840 to operate the road. Including a debt service increase of $16,500 to $520,000 the increase in gross was eight times the increase in expenses.

Largest increases in operating expenses were in administration, which rose from $32,261 in 1948 to $41,313 in 1949, and in fare collection, which went from $91,108 in 1948 to $102,174 in 1949. There was a tiny increase in the cost of roadway and structure maintenance, and cost decreases in accounting, garages, shops and equipment, the latter down 33%.

SPEEDS WASHINGTON TRAFFIC—One of Washington's most needed improvements, the new $6,000,000 highway bridge between the District of Columbia and Virginia, adds four traffic lanes at a major bottleneck. The Pentagon is at upper right. (Wide World Photo)

No second Bay Bridge

Engineering work for a second San Francisco Bay Bridge is being abandoned (ENR, Apr. 27, p. 17). California is to the division to Congress' failure to grant a right-of-way across Yerba Buena Island. But Washington won't legislate on local matters if there's no unanimity on what's wanted, and California Congressmen disagree on type of crossing.

Thus, the state Public Works Department is disbanding an engineering organization of about 70 which had been expected to grow into a second Bay Bridge construction group.

On July 1, much of it will be assigned to preliminary engineering on a proposed highway bridge across the north arm of the bay between Richmond and San Rafael. The legislature has appropriated $200,000 for this work, following a "preliminary" study and report by Earl & Wright, San Francisco consultants. Estimated cost of the crossing is $36,000,000.

Salt Lake pollution creates health hazard

Consulting engineers to be called in on problems arising from sewerage disposal in bay city and county

Salt Lake City, Utah, and Salt Lake County officials will call in consulting engineers to discuss an increasingly critical sewage disposal problem. City and county sewage at present passes from trunk line sewers on the west side of the city into open ditches and flows into a bay of the Great Salt Lake. The city alone dumps 35 mgd of raw sewage into the lake, and county communities and towns in Davis County reportedly contribute another 15 mgd. For many years it had been believed that the high salt content of the lake effectively disposed of the bacteria content, a theory that has now been largely disproved.

A great body of filth has been observed recently near the outfall sewers, and city health authorities, led by Dr. James Z. Davis, health commissioner, are alarmed about the situation. Public bathing beaches are in heavy use each summer a dozen miles from the "sewage bay," separated from the lake proper by Antelope Island, which has been a peninsula rather than an island during the past decade because of the low level of water in the lake.

However, with heavy runoffs the past three years, the lake level has risen to a point that is again cutting Antelope Island off from the mainland. Health Commissioner Davis said that another 6-in. rise in the water level "will be critical."

"Even now high winds are blowing the sewage over the natural promontory which has recently kept the island connected with the mainland." Dr. Davis expressed belief dikes might be erected as a temporary but expensive measure to keep sewage from flowing into the lake proper.

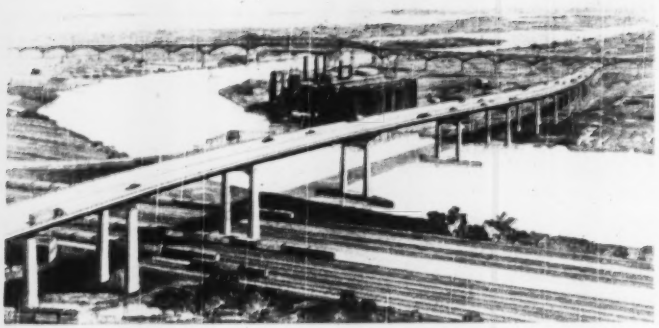
Helicopters to be used in B.C. coastal survey

Surveyors for the British Columbia government will make full use of helicopters this summer in mapping inaccessible areas of the coastal range.

The Geodetic Survey Branch plans to use a machine to cover a large district east of Portland Canal in northern B. C. this year.

Conventional seaplanes will carry supplies between Stewart and Meziadin Lake and crews will move to difficult locations by helicopter.

Helicopters were used last season, but plans for the present year are more extensive and cover a larger area.



RECORD BREAKING BRIDGE—This bridge will carry New Jersey's Turnpike across the Passaic River in Newark and Kearney. Chairman Paul Troast, of the Turnpike Commission, says its river span, of approximately 375 ft, will be the longest on record in the country for this plate girder type of bridge. The overall length will be almost 7,000 ft. Drawing shows the Pulaski Skyway in the background.

No proof U.S. stream flow declines

Rainfall and snowfall records going back a century or more indicate no continuous downward or upward trends in the water supply of the United States. These long-term records, though few in number, suggest that the present phase of diminished precipitation probably is temporary, according to an appraisal by Joseph V. B. Wells and Conrad D. Bue, of the U. S. Geological Survey.

Their conclusions were given to the American Meteorological Society, assembled in Washington, D. C., as part of the thirty-first annual meeting of the American Geophysical Union.

On water supply, the USGS men discounted the rather widely accepted belief that streamflow generally is declining. Only for some areas, they said, do streamflow records show a downward trend in rainfall-runoff relationships during the last 20 to 30 years. Studies so far have failed to indicate any consistent geographical pattern in the distribution of these areas.

From studies of available hydrologic records, including those that go back much farther than the streamflow data, the two USGS men concluded that a decline in surface water supply is not yet significant on a country-wide basis. Rather, they indicated, our streams continue to be reliable sources of surface water.

• Utah studies reported—Effects of water utilization by aspen trees, herbaceous plants and bare ground on the water available for stream flow are being studied for three summers on the high and humid Wasatch Mountains in Utah, were reported by A. Russell Croft, of the U. S. Forest Service. During the June 1-Sept. 15 growing season, total evapotranspiration averaged about 15, 13 and 11 in. respectively for the aspen, herbaceous and bare sites. These evapotranspiration data are the difference between moisture content at field capacity and that at the end of the growing season, averaged about 12, 9 and 4 in. for the three sites, measured in 6-ft-deep soil mantles. These data represent the amount of water that must be replaced before water can pass through the soil to streams or underground storage.

Summer rains averaging 7 in. caused no erosion of the aspen or herbaceous sites but carried off about 8 tons of soil per acre from the bare area.

• New measuring method—Tide ranges in coastal bays can be determined by a new theoretical treatment, Alfred C. Redfield, of the Woods Hole Oceanographic Institution told the geophysicists. Amplification in range of tide at the head of a bay depends upon relations between the wave period and the dimensions of the channel, he said.

Treatment of the tides as standing waves modified by damping of the primary and reflected progressive waves into which the standing waves may be resolved, permits an estimate of the amplification as a function of the dimensionless constant and the phase change undergone by the primary wave along the length of the channel. By a method Redfield described, the damping coefficient and the phase relations of the primary wave can be determined from data on tidal range and time of high water along a channel.

With damping coefficients such as apply to typical coastal bays, the augmentation of the tidal range will not be greater than fourfold. In the Bay of Fundy, the conditions for resonance are not unusual, Redfield said. The exceptional range in tide there is due to the great range in tide in the Gulf of Maine, combined with optimum amplification conditions in the bay.

Walter H. Bucher, professor of structural geology, Columbia University, was reelected president of the American Geophysical Union for 1950. Elected vice president and general secretary, respectively, were Francis W. Reichelderfer, chief of the U. S. Weather Bureau, and K. Hilding Ten, assistant chief, Hydraulics Laboratory, National Bureau of Standards.

Six provinces agree on Trans-Canada road

Six of the ten provinces of Canada have signed agreements with the dominion government for the joint financing of a paved Trans-Canada Highway within their boundaries (ENR Dec. 22, 1949, p. 27). The joint financing will thus be handled by Ontario, Manitoba, Saskatchewan, Alberta, British Columbia, and Prince Edward Island.

Small technical difficulties alone now prevent the other three Maritime Provinces from signing.

The province of Quebec, however, has not yet given any evidence of its approval.

Cost is estimated by the six signatories amount to $220 million, with an additional $30,000,000 known to be necessary for the road across Newfoundland. It therefore appears that the total cost of $300 million originally estimated to be shared equally by dominion and provincial governments will be considerably exceeded when all provinces enter.

The highway will start at the western end at Vancouver and by way of Chilliwack and Kamloops go through the Kicking Horse Pass in the Rocky Mountains to Banff and Calgary. From there it will turn southeastward to Medicine Hat, across the prairies almost a straight line to Regina, to Winnipeg, and then enter Ontario through existing roads to Kenora in the Lake of the Woods area from Kenora to Port Arthur-Fort William at the top of Lake Superior, and then by a new road to Nipigon, Schreiber and Chapleau to Sudbury, a virgin territory. From Sudbury via Parry Sound, through Muskoka Lakes country to Peterborough, then through more resort area to Ottawa and Montreal. The route through Quebec and east has not yet been determined.

No property right in pollution, AWWA told; eminent domain not required

Annual meeting of water works group hears exposition of board powers held by states for pollution abatement action

John C. Bumstead
Associate Editor

The public is neither powerless nor forced to spend its money for property rights to abate stream pollution. State legislatures hold the key to this problem under their constitutional powers, American Water Works Assn. members were told last week.

"Those who pollute public waters," said John M. Murdoch, Jr., vice president and counsel of the American Water Works Service Co., "have no property rights that entitle them to continue irresponsible discharge of wastes. The state—through its police powers—can stop such pollution."

"Constitutional power is available to prohibit discharge of wastes, without payment of damages although much money loss might be entailed. The only question is: To what extent is the legislative branch of the (state) government willing to go in authorizing the use of police power? The legislature must fix the standards and limits of permissible pollution, it must weigh the social advantage of land use and industrial development against the public needs."

• **Legal points**—Murdoch, whose talk keyed a pollution conscious, four day annual meeting of AWWA at Philadelphia, added that legislatures must strike a balance in a general law to be enforced wherever applicable.

"The differences between police power and the right of eminent domain should be understood," he continued. "The exercise of police power is an inalienable right of the state, and the state must protect health and safety of its inhabitants. This is done under police powers.

"When acting in a reasonable exercise of police power, the state is not required to pay compensation, to interest adversely affected.

"But, when property itself is required by the state, it must be taken by the power of eminent domain, and owners must be compensated.

"Most importantly, though this should be understood: The exercise of police power for protection of the public welfare is not the exercise of the power of eminent domain."

• **Tooth protection**—Among other principal discussions at the Philadelphia meeting was a tentative report on results of a fluoridation program at Newburgh-Kingston, N. Y.

According to Charles Cox, water engineer of the state Department of Health, early results are sufficiently encouraging that the state has sharply modified restrictions on fluoridation previously imposed.

Newburgh children, who have been using water with fluorine show 50 percent less tooth decay since the experiment was started in 1945, than do children of Kingston, where water does not contain the chemical.

For this reason, the state department has dropped its requirement that any community wishing to add fluorine to its water, set up an elaborate medical and dental organization.

• **Awards**—New honorary members of AWWA include: G. W. Pracy, general manager, San Francisco Water Department; Jack Hinman, consulting engineer of Iowa City; and Murdoch.

The John M. Goodell prize (sponsored by ENGINEERING NEWS RECORD) was awarded to A. P. Black, professor of chemistry, University of Florida; W. Victor Weir, president of the St. Louis County Water Co. (and new AWWA president), and A. E. Berry, director of sanitary engineering, Province of Ontario, of Toronto, for a policy report on adding fluoride to public water supplies.

Joseph Schwada, city engineer of Milwaukee, received the John M. Oseen Award.

Next meeting will be held in Miami.

Resume Delaware bridge construction work

All work was resumed May 25 on the strikebound Delaware River Memorial Bridge, after a spectacular settlement of a labor dispute that finally involved a trans-Atlantic telephone call to a union official.

The two-weeks old controversy (ENR May 18, p 27) started with a walkout by operating engineers, who sought to force signing of a contract between their union and H. C. Eastburn & Sons Co., grading contractor on a bridge approach. The grading contract will be completed in 10 days.

A picket line established by the operating engineers had the effect of slowing and in some cases halting the work of two other contractors—Merritt, Chapman & Scott (substructure) and American Bridge Co. (superstructure). Some workers for these two contractors honored the picket lines, others did not—but work was grinding to a halt on the $40,000,000 bridge as the operating engineers continued to stay away.

The end of the confusing dispute came with a telephone call May 24 to William E. Maloney, an international officer of the operating engineers' group. Located in London, Maloney conferred with union officials and contractors, meeting in Wilmington. Soon after the telephone conference, picket lines disappeared. No settlement terms between the disputants were announced, however.

Only bar to full operation now, engineers said, was recalling full manpower. Many workers had returned to their homes, or found other work when the strike dragged out longer than had been expected.

BIG WIND—This Superior, Wis., coal dock was wrecked recently by a sudden windstorm clocked at 88 mph. Two others were similarly destroyed. (Acme Photo)

Traffic goes down and around Washington's Dupont Circle

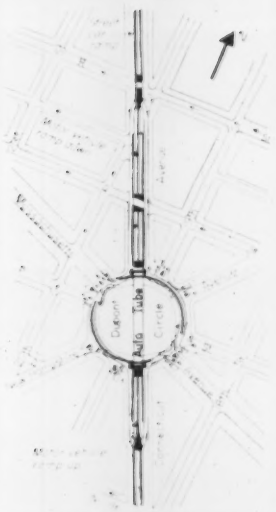
Dupont Circle, astride busy Connecticut Avenue connecting Washington's residential Northwest with downtown, no longer cusnares District drivers. Recently completed was a $4,775,000 vehicular underpass.

Trolleys used to buck southbound traffic around the circle. Now they skirt its perimeter underground. Connecticut Avenue traffic, formerly beset by the impairing of four other streets, now tunnels straight through. Surface traffic now flows in fixed lanes. About 55,000 vehicles daily will pass around and under the circle, more than 5,000 at rush hours. There'll be 560 trolley trips through it daily, plus numerous bus runs.

John McShain, Inc., Philadelphia, was contractor. It was a major builder at the Pentagon, early in the war, is now building the $21,000,000 General Accounting Office and rebuilding the White House in Washington, and building a $16,500,000 federal health structure at nearby Bethesda, Md.

The underpass structure alone required 25,000 cu yd of concrete and 2,850 tons of steel. There were 151,356 cu yd of dirt excavated. There are three tunnels, one each for north and southbound trolleys, one straight through for vehicles. The transit tubes are 3,100 ft long and 14 ft, 6 in. high. The vehicular tubes have 22-ft roadways with 5-ft sidewalks and a 4-ft median strip. They also are 14 ft, 6 in. high. There's an underground trolley loading platform.

(Washington Post Photo)



Announce new rules for Wherry Act housing

New uniform procedures to be followed by the Army, Navy and Air Force in selecting sponsors and processing projects for so-called Wherry Act housing have been distributed among the military services and the Federal Housing Administration.

These aim to speed site selection and construction through the use of local architects and engineers. They call for competitive bidding against identical plans and specifications, as required by recent amendment of the Housing Act.

The new rules apply to all installations where proposals have not been previously requested. Where proposals have been submitted under the old system, it will apply.

Whenever Army, Navy or Air Force decides that housing should be constructed at any installation, the number and type of dwelling units will be announced by the installation commander. Then the appropriate officer—district engineers for the Army and Air Force, and district public works officers for the Navy—will negotiate contracts with local architects-engineers for plans and specifications. Close liaison will be maintained with the local FHA field offices.

When plans and specifications are ready, application or precommitments or mortgage insurance will be made to the FHA. After commitment is obtained, district engineers or district public works officers will issue invitations for bids using, in general, customary procedure.

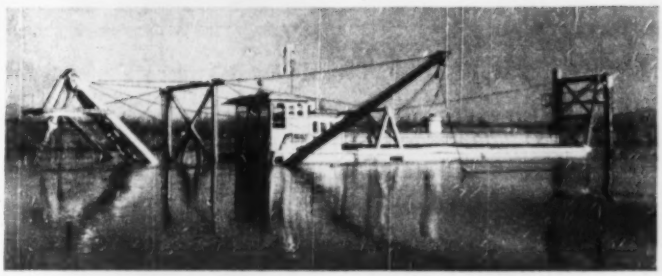
The low bidder will become the sponsor of the project. He will complete his arrangements with the district engineer or the district public works officer for obtaining lease, utility and other contracts involved.

Construction will be supervised by FHA inspectors in the same way as on other FHA rental housing projects.

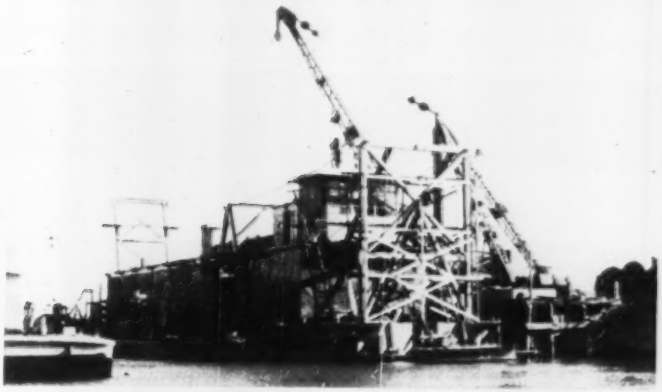
Additional highway funds

Additional highway funds are being made available through general fund appropriations and toll bond issues. Rhode Island will vote on a $12,000,000 bond issue. New Hampshire has a proposal for $1,000,000 in bonds. Proceeds would go to primary and secondary highways. A one cent gasoline tax would be continued until the bonds are retired. Mississippi has a new program whereunder proceeds of sales taxes on motor vehicles and trucks—about $8,000,000—will go to the counties for "secondary roads." And the Oklahoma Turnpike Authority has sold $31,000,000 in bonds to banking houses at 3½%.

Sunken dredge "Colorado" . . .



. . . raised and ready for service



Rehabilitation of the U. S. Bureau of Reclamation dredge "Colorado", which sank five months ago, was completed early in May. The craft will return to channelization work on the Colorado River soon.

The total cost to raise and put the dredge back in operating condition was approximately $160,000, or about 67% of the low bid received for only raising the dredge, according to the bureau. All work was done by government forces. The dredge was described in ENR March 31, 1949, p. 58, and information on the sinking and raising was supplied in a letter by L. A. Moritz of the Bureau (ENR May 4, 1950 p. 46).

A board of investigation appointed by the bureau concluded that water entered the hull in the center pontoon at the bow through a vertical type, ejector check valve held open by silt clogging.

Finally these valve openings are above water. However the dredge was somewhat lower at the bow than anticipated in the design, a shift in the river flow loosened the after spud, causing the dredge to slip downstream, tightening the anchor cables and further depressing the bow, and finally as water entered the forward pontoon through the faulty ejector line the bow went down more, permitting water to enter openings on the deck. The dredge was raised by pumping out timber sheeted cofferdams placed in the several compartments of the hull.

Many minor changes have been made by the bureau to prevent a similar occurrence. All openings in the deck and in the pontoon sides are being closed. Electrical wiring and spud hoisting cables were removed from the hull and placed well above the deck. Sump pump discharge was relocated so bilge water spills some 2 ft above the dredge deck. A 19-in. high coaming will prevent water entering the open engine room compartment cockpit.

Included on the board of investigation returned by the bureau to study the possible causes of the sinking of the dredge were Jean Allen, a dredge designer who acted as consultant for Pacific Coast Engineering Co. on the original design and construction of the dredge; W. C. Beatty, mechanical engineer formerly with the Bureau of Reclamation; and T. R. Douglass, assistant regional director, Region III.

CONSTRUCTION BUSINESS

Labor contracts raise wages 10-12½¢; some unions swap cash for welfare

Labor agreements this spring raise contractors' labor costs an average of 12½ cents hourly for skilled workers, 10 cents for laborers, the pattern of agreements to date indicates. This comes to about a 5% increase for skilled work and 7% for unskilled.

Most bricklayers are capitalizing on their bargaining position.

Here's the general pattern by region and size of city:

• **Big cities in Northeast.** Unions in big eastern cities and in Chicago are giving a bit on direct wage increases to get welfare funds. They're also willing to go part way with contractors for a wage stabilization with two-year contracts.

So labor costs aren't up so much in Washington, New York, Chicago and Boston. But Philadelphia rates are all over the lot: plumbers, plasterers and lathers took 7½ cent pensions and no wage gains for two years, while straight wage increases go from 10 cents for laborers to 25 cents for bricklayers.

• **South and West.** Unions in the South and West are getting straight wage hikes. So are medium-size eastern cities like Buffalo and Baltimore. Unions in most cities of the Middle and Far West are getting a 12½ cent raise.

They're cutting down the difference between their rates and those of the strongest unions in the east. And they're also watching to see how those welfare funds work out.

• **Welfare plans taking hold.** It was not unique when N. Y. City bricklayers and some other tight knit groups got welfare funds this year. That's been a growing trend. But eyebrows went up when Chicago laborers negotiated a welfare insurance fund. ENR May 18, p 34.

Welfare demands have been dropped this year pending further study by Boston laborers, electricians and bricklayers. Most big cities in the West and North in New Jersey (carpenters and bricklayers part of the N. Y. City metropolitan area) have welfare funds.

• **Strike record good.** There've been few big strikes. Most have been quick ones the first two or three days after the end of old contracts. In many cities this month, workers stayed on the job after contracts expired. But all Denver trades were out on strike last week; their contract ran out in April.

Some important cities where general settlements should be announced soon are Denver, Los Angeles, New Orleans and St. Louis.

Summary of labor cost increases

General Pattern

	Immediate	Later	Period
Baltimore			1 year
Buffalo	+12½	+12½	18 mos
Chicago	+10¢ welfare		1 year
Cleveland	+12½		1 year
Detroit	+12½		1 year
Kansas City	+10		1 year
Toledo	+12½	+12½	2 year

Some other increases

Boston			
laborers	+10¢ welfare	0	2 yrs
carpenters	+10	0	2 yrs
lathers	+10	0	2 yrs
all trades	10¢ welfare		1 year
painters	10¢ welfare		1 year
N. Y. City			
electric	+10		6 mos
bricklayers	+25¢ welfare	0	2 yrs
Washington D.C.			
laborers	+10¢ welfare	+0	2 yrs
carpenters	+10¢ welfare	0	2 yrs
Philadelphia			
bricklayers	+25		1 year
carpenters	+12½	+12½	2 yrs
plumbers	+7½ welfare		1 year
laborers	+10	+12½	1 year
plasterers	+7½ welfare	+0	2 yrs
St. Louis			
bricklayers	+25		1 year
steamfitters	+12½		1 year
laborers	+10		1 year
Los Angeles			
bricklayers	+12½		1 year
San Francisco			
bricklayers	+15 & 6 welfare		1 year
laborers	+10		1 year

Lumber output high, but demand's still higher

Mills reporting to the National Lumber Trade Barometer shipped 3% more lumber than they produced in the week ending May 13.

But this gain is in dial match new orders for the first time in months. For the year to date, shipments have been 14% above production; orders have netted 2% above production.

• **Douglas fir output high.** Douglas fir mills the second week in May turned out 25% more than they averaged since January 1 and 16% more than they produced a year ago. But shipments in the week were 1% above production. New orders were 6% under current output.

Aluminum up ½ cent

Aluminum Co. of America upped its price on aluminum by ½ cent a pound the end of last week. This is for ingot, sheet, plate, extrusions and metal powder. New prices are 17½ cents for 99% metal and 16½ cents for 98%.

Magnesium prices are up, too, effective June 1 at 22½ cents.

Industrial Building is rising fast

There's another good year ahead for industrial building contractors and suppliers. It won't be as big as '48, but it may rival '49.

• **Contract awards spurt.** May contract awards for new industrial building took such a jump they brought the cumulative 1950 total to $480 million—24% ahead of last year.

Ever since February, industrial building contracts have shown growing strength. By mid-April they had brought 1950 equal with a year ago. At the end of April, they were up 4%. The May total at $125 million in contracts compares with $48 million a year ago—a 160% increase.

• **Where is this new plant?** The Middle West, South and Southwest are getting most of the new industrial building this year.

• **What industries are building?** Contracts for new construction of auto factories have shown a big jump.

Other industries contracting more new building so far this year than last are the railroad, food, metal refining and rolling, and the machine and machine parts industries.

Industrial Buildings Contracted by type of industry (in thousands)

	5 months		%
	1949	1950	chg
Railroad	$ 22,422	$ 80,324	+258
Food & kindred	17,344	41,148	+137
Textiles	126,292	28,222	-78
Primary industries	29,444	23,558	-20
Fuel	28,454	41,342	+46
Metal refg. & rolling	5,000	22,975	+359
Auto factories	242	22,588	+9,236
Aircraft factories	100	0	-100
Machine	1,000	1,200	+20
Machine parts	22,232	41,291	+86
Radio & television	350	0	-100
Chemical	3,000	2,000	-33
Wood industries	1,000	2,215	+122
Miscellaneous	1,000	2,000	+100
Miscellaneous	1,000	1,400	+40
Total buildings	$320,650	$541,584	+69

Industries raise plant and equipment budgets

The rise in industrial building activity is evident from contracts reported to ENGINEERING NEWS-RECORD and supported by budget increases that give it strong support.

A resurvey of capital investment intentions by industry raises the total from $11.2 billion for new plant and equipment, from the $12.4 billion budget originally estimated for 1950.

The revision comes out when surveys made by Business Week correspondents this month under the direction of the McGraw-Hill Department of Economics.

The downtrend of investment that began in late 1948 has reversed. Industries' purchases of plant and equipment the second half of this year is scheduled to be 3% higher than the first half, not including steel.

BIDS AND BIDDERS

(Major project news received after Construction Reports, page 66, went to press)

Subway—Rayner Construction Ltd., Leaside, Ont., was the successful contractor for Sections S-3, S-4 and S-5 for Yonge Street Subway in Toronto, to cost about $7,000,000. Toronto Transportation Comm. awarded contract.

Hospital—Pennsylvania General State Authority, Harrisburg, plans Eastern Pennsylvania Psychiatric Institute in Philadelphia. Estimated cost is $7,200,000. Hough, Livingston & Larson, Philadelphia, are architects. A. F. Jones is engineer for owner.

Housing—J. E. Millstone Construction Co., St. Louis, Mo., was low bidder at $7,500,000 for building public housing for the St. Louis Housing Authority. George Hellmuth and Associates, St. Louis, are architects.

Bridge—Frederick Snare Corp., New York, N. Y., will construct $5,475,000 bridge over Reynold Channel, Atlantic Beach, N. Y., for Nassau County, Mineola, N. Y. Hardesty & Hanover, New York, are consulting engineers.

Residences—Wolhoff Brothers, Flushing, N. Y., plan constructing residences at Bayside, N. Y., to cost about $7,500,000. A. H. Salkowitz, Jackson Heights, N. Y., is architect.

Hospital—Gilbane Building Co., Providence, R. I., has been awarded $5,329,933 contract for dormitories at State Institution, Taunton, Mass., by Department Mental Health, Boston. Leland & Larson, Boston, are architects.

Steam Electric Plant—South Carolina Electric & Gas Co., Columbia, S. C., plans steam electric plant at Hagood, near Charleston, S. C., to cost about $5,475,000. Contracts will be awarded in 1951.

Piers—Port of Boston Authority, Boston, awarded contract for the construction of piers in Boston Harbor at Charlestown to Merritt-Chapman & Scott Corp., New London, Conn., at $3,472,117. Thomas Worcester, Boston, is consulting engineer.

Bridges and Roads—Pennsylvania Turnpike Commission, Harrisburg, received low bid for constructing bridges and roads Section 30E Pennsylvania Turnpike from Harrison Construction Co., Pittsburgh, at $2,236,367 and for Section 30F from Patterson Construction Co., Monongahela, at $2,422,071. Both projects are in Allegheny County.

Department Store—May Co., Cleveland, O., plans to construct department store in Rocky River, O., to cost about $3,000,000.

Dwellings—Plantation Development Corp., Houston, Tex., plans group of dwellings to cost about $3,500,000. Perry Johnson, Houston, is architect.

Aircraft Factory—Del E. Webb Construction Co., Los Angeles, Calif., will construct aircraft factory at Culver City, Calif., for Hughes Aircraft Co., Culver City. Estimated cost is about $2,000,000.

Housing—New York City Housing Authority, awarded contract Section 2, Melrose Homes, to John A. Johnson Sons, Brooklyn, at $2,588,000. The same contractor is now working on Section 1. Louis E. Jallade, William F. Koch and Louis E. Jallade, Jr., New York, are architects.

High School—Board of Education, Los Angeles, Calif., will open bids June 21 for San Fernando High School. Cost is estimated at $2,000,000. Albert C. Martin & Associates, Los Angeles, are architects.

Oahe Reservoir—Guy H. James Construction Co., Oklahoma City, Okla., was low bidder at $2,280,717 for earthwork, Stage 1, Oahe Reservoir project near Pierre, S. D. U. S. Engineers, Omaha, Neb., opened bids May 25.

Plant, Office and Warehouse—The Austin Company, Cleveland, O., will build plant, office and warehouse at Mount Vernon, O., for the Pittsburgh Plate Glass Co., Pittsburgh. Estimated cost is $2,000,000.

Apartment—Morris Pickman, Jamaica, N. Y., plans three apartment houses in Jamaica, to cost about $3,200,000.

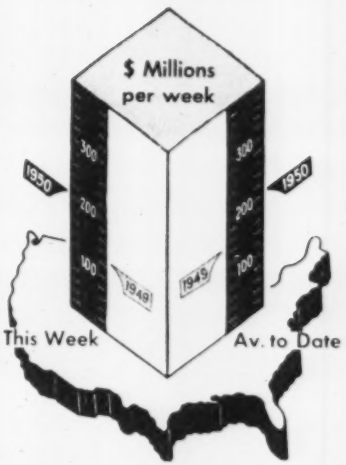
Bridge—City of Boston, Institutions Department, awarded contracts for viaduct over Boston Harbor from Moon Island, to Long Island, to Merritt-Chapman & Scott Corp., Boston, at $2,593,461. Crandall Engineering Co., Boston, is engineer.

Road—Savin Construction Co., East Hartford, Conn., was low at $2,340,658 for constructing road in Gloucester, Camden and Burlington Counties when the New Jersey Turnpike Authority, Trenton, N. J., opened bids May 23. Fleming, Cuddry & Carpenter, Inc., Pa., is consulting engineer.

COSTS AND VOLUME

ENR INDEX NUMBERS

Index Base	100	1913	1926
Construction Cost	May '50	496.53	228.69
Building Cost	May '50	284.27	196.91
Volume	Apr. '50	287	170



Activity This Week

As reported to ENR (in millions of dollars)

Amount of contracts let

	1 Day Week of June 1 1950	Cumulative 22 wks 1950	Cumulative 22 wks 1949	% chge
Federal	$106.2	$629.1	$444.9	41
State & Mun.	74.4	1,256.6	1,210.4	4
Total Public	$180.6	$1,885.7	$1,655.4	14
Total Private	100.0	2,819.2	3,362.4	-16
U. S. Total	$280.6	$4,704.9	$5,017.8	-6

Contracts by type of work

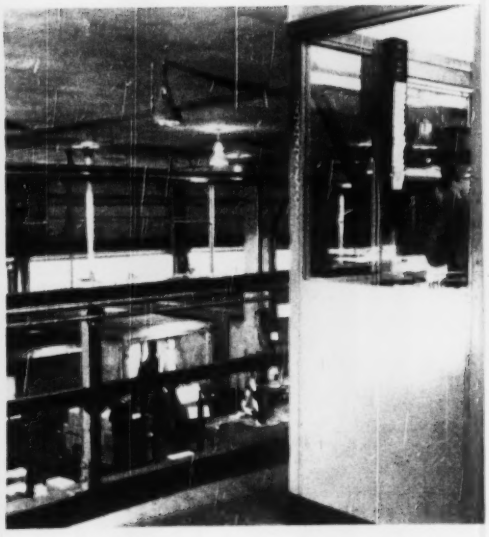
	This Week	Cumulative 1950 22 wks	Cumulative 1949 22 wks	% chge
Waterworks	4.8	89.5	82.2	+9
Sewerage	4.2	158.3	160.8	-2
Bridges	12.2	150.1	142.4	+5
Highways	24.3	499.1	315.9	+58
Earthwork & Waterfront	3.9	183.0	272.8	-33
Buildings:				
Public	21.2	814.0	656.5	+24
Industrial	28.0	437.8	295.9	+48
Commercial	71.4	1,847.6	961.2	+92
Unclassified	2.7	204.9	214.9	-5

NOTE: Minimum size projects included: Waterworks and waterfront projects, $25,000; office public works, $50,000; industrial buildings, $50,000; other buildings, $250,000.

Apartment—Louis R. Solomon & Associates, Chicago, are asking bids for the construction of 17-story apartment in Chicago. Estimated cost is about $2,500,000.

TERMINAL near the Holland Tunnel in New York City will keep many over-the-road trucks off city streets.

Truck Terminals Reduce Handling Costs



1 Dispatcher in gallery office checks on shipment being unloaded from over-the-road carrier onto flat carts, makes use of . . .

2 Pneumatic tubes to speed dispatching. Control section on a mezzanine processes papers thus received. Then . . .

With completion in June of the Newark Union Motor Truck Terminal, the Port of New York Authority now has two truck terminals in operation in the New York Metropolitan area. Both receive less-than-truckload traffic (mixed merchandise shipments) and sort it for interchange between over-the-road units and local city trucks. Mechanical handling and consolidating features are expected to reduce truckers' handling costs compared with individual terminals.

In addition, traffic congestion on city streets is decreased. It is unnecessary for many over-the-road trucks to pass through the more congested streets of New York City or Newark to reach their terminals. Neither do they block streets when parked for loading and unloading.

• **The New York terminal**—first to be completed—went into operation last November. It is located in downtown Manhattan four blocks from the Holland Tunnel, main artery for trucks from the south and west. The structure is 1,000 ft long and 175 ft wide, including a 3-story office portion and a maintenance and repair station at one end. Parking space for 115 trucks is provided on the roof.

The freight platform, 800 ft long and 50 ft wide, will accommodate 144 trucks. At one end is a 10-ton overhead crane for cross-platform handling of heavy loads. Longitudinal movement of freight is accomplished with flat platform carts that engage an overhead conveyor suspended from the underside of the dispatch gallery and running the full length of the platform.

• **The Newark terminal**—two miles from the center of the business section of that city—is adjacent to N. J. Route 25 (U. S. 1), main artery from the south and west, and the New Jersey Turnpike, now under construction. Only 0.4 miles south of the Holland Tunnel, it also is located conveniently for trucks coming from the north and east.

The Newark building is 1,174 ft long and 202 ft wide. Its freight platform, 1,022 ft long and 100 ft wide, accommodates 168 trucks. Mechanical handling of freight differs from that used in the New York terminal in that the longitudinal conveyor is under the floor. This is believed to have the advantage of site operation at higher speeds, reduction of mixed handling of most trucks on the conveyor line, a resulting higher productivity per man-hour and an increase in the overall efficiency of the entire operation. The chain conveyor operates about 5 in. under a slot in the platform. To attach a flat cart, a platform man lowers a short bar at the front of the cart to engage a dog on the continuous, moving chain. When the cart reaches its destination, another platform man detaches it by raising the bar.

• **Design features**—In both terminals, dispatching is facilitated by pneumatic tube, public address and two-way intercommunicating systems.

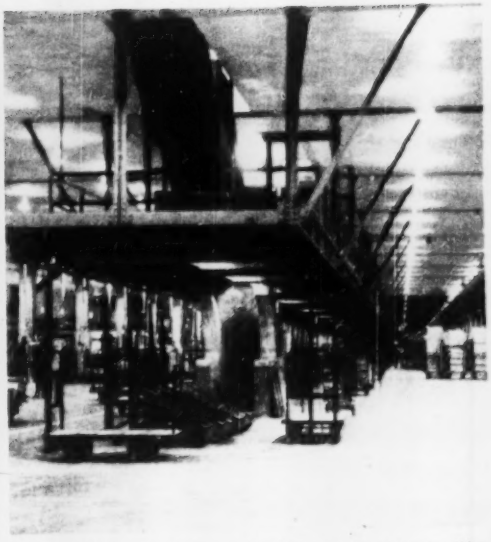
With the exception of a 175-ft long section of reinforced concrete at one end of the Newark terminal, both buildings have structural steel frames and brick walls. Truck berths are paved with reinforced concrete. The platform floor is asphalt block, except at the conveyor, where it is concrete treated with a hardener. Floors in the office section are asphalt tile on concrete, and in the dispatch gallery concrete fill over light-gage steel decking. The New York terminal has a concrete parking roof, the Newark structure composition roofing over light-gage steel decking.

The terminals were designed and are being operated by the Port of New York Authority, for whom John M. Kyle is chief engineer and Walter McQuade, architect.

New York Union Motor Truck Terminal cost $9,000,000. Caldwell-Wingate Co. was awarded the general contract on a $3,337,000 bid, Grove, Shepherd, Wilson & Kunze the foundation contract on a $995,968 bid, and American Bridge Co. the steel contract on a $565,217 bid.

Newark Union Motor Truck Terminal cost $8,000,000. James J. Waters Corp. was awarded the general contract on a $3,988,240 bid, Stack Construction Co. the foundation contract on a $769,320 bid, and Harris Structural Steel Co. the steel contract on a $637,655 bid.

3 Platform man couples flat cart to overhead conveyor (in New York only—Newark has under-floor system) and . . .



4 Flat carts unattended move the length of the platform. They are detached at local truck loading station.

THE NORTH SIDE POOL is ready for the 1950 season. It has ample sunbathing area including a deck above the bathhouse. Flood and underwater lighting permit night swimming.

How to Design a Swimming Pool:

- 1,000-swimmer capacity
- Ample sun-bathing area
- Diatomite-earth filters
- A rugged, efficient bathhouse

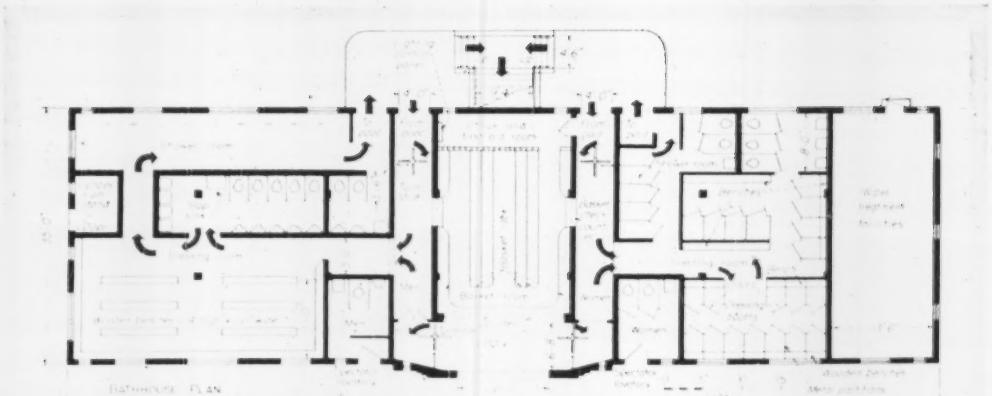
Paul M. Holmes
Sanitary Engineer
Allen T. Stilson Associates Ltd.
Columbus, Ohio

WHEN THE SUMMER SEASON rolls around, the people of Hamilton, Ohio, will have a brand-new up-to-date swimming pool ready for operation. The North Side pool, the first of two to be built, opened its gates on the traditional first day, Memorial Day.

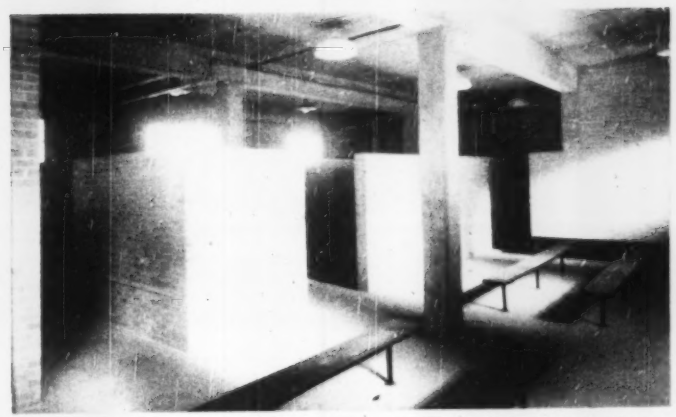
Completed after a long war-bred delay, this pool is the first step in expanding the city's recreational facilities. Built at a cost of $165,000, it points up the latest design practices that make for good swimming, pleasant sunbathing and protective sanitation.

• **Location.** When the city decided to build swimming facilities, two possibilities were considered. One pool at a central point or two pools in widely separated areas. The latter plan was chosen because it serves the public's interests better.

The North Side pool is adjacent to a junior high school on a site entirely devoted to recreational activities. Adequate auto parking space is available



BY ROUTING PATRONS from the dressing rooms, by the toilets and into the showers, the bathhouse layout stimulates better swimmer cleanup



THE MEN'S DRESSING ROOM has sturdy wooden benches and low-height partitions around toilets to improve ventilation.

SWIMMERS can enter the pool only by passing under a bank of showers.

Public transportation is by bus line.

It is estimated that the pool in this location will serve a population of 15,000.

• **Size**—Drawing from 2.5% of the city's population, the pool is designed to handle 1,000 swimmers at a time. Swimming and diving areas are expected to handle patrons in the ratio of 3:1. Pool size is about 75x150 ft.

Total deck area at pool level is 9,100 sq ft. This is made up of a 20-ft deck between the pool and bathhouse and 15-ft walkways on the other three sides.

An additional sunbathing area—4,000 sq ft—on the roof of the bathhouse—lends itself to other uses such as a spectator's gallery and outdoor dancing. The mopped-on membrane waterproof roofing is topped with a 3-in. concrete wearing slab. Access is by stairs from the pool level.

These swimming and "loading" areas provide more than 24 sq ft per person under maximum load.

• **Water sanitation**—Water treatment sequence is: Hair-and-lint straining, diatomaceous-earth filtration and chlorination. Circulation is by a side-suction electric-motor-driven centrifugal pump.

Clean water enters through 24 submerged inlets spaced around the pool to insure uniform circulation. Duty water is drawn off both upward through the overflow trough and downward through bottom outlets. It is carried directly, in closed piping, to the strainer, which is set ahead of the pump. The pump forces the water through the filter and back into the pool after chlorination.

Filtration is by two vertical upflow diatomite units. Each 60,000 gal per hr unit has a normal operating rate of 5 gal per sq ft per min and occupies about 60 sq ft of floor space. Filter shells—designed for 100-psi working pressure—are tank-quality steel.

The top head of filters is removable, being fastened to the shell by a flange joint. The manifold plate—from which filtering elements are suspended into the raw-water chamber—is inserted in this joint.

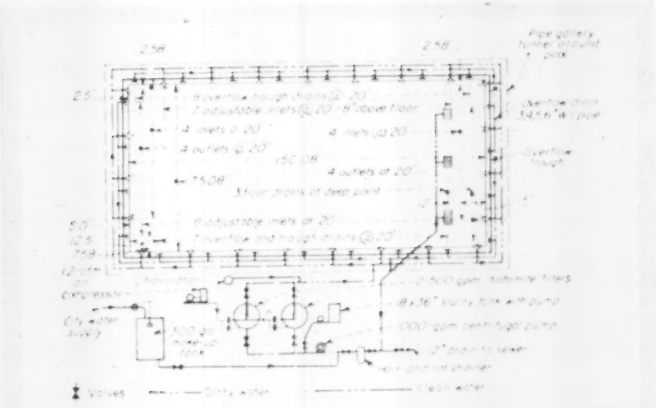
With 50 bronze-wire-wound tubular elements in each unit that carry a bed of pressure-deposited diatomite, water is filtered as it is forced upward and through them by pump pressure to the filtered water chamber. The 3-in. diameter, 24-in. tubes give a filtering area of 100 sq ft per unit.

Diatomaceous earth as a slurry is delivered continuously during filtration from a 100-gal feeder to the pump suction by an auxiliary pump. Filter elements are pre-coated with concentrated slurry through a valved connection.

To insure complete removal of compacted diatomite from the element during backwashing, compressed air can be applied to the filtered-water chamber through a quick-opening valve.

• **Pool construction**—The rectangular shaped pool is built with reinforced-concrete walls, bottom slab and decks.

Walls are designed as vertical cantilevers with vertical and horizontal reinforcing in each face. The four bot-



DIATOMACEOUS EARTH FILTERS purify duty water—drawn off from the surface and the bottom—continuously. Turnover of pool contents is completed in 6.67 hours.

tion slab is reinforced with 6x6-in. No. 6 wire mesh in the top. Horizontal expansion joints are carried on an 8-in. deep footing.

Expansion joints across the bottom slab and adjacent to the walls are filled with 5.5x0.5-in. premolded asphalt strips and pointed with mastic. Similar construction is used for vertical expansion joints.

A scum-type overflow trough is formed into the top of the side walls. Drains to return piping are 24-in. spaced on 15-ft centers.

A system of subsurface drains under the pool bottom insures a dewatered foundation.

• **Pipe gallery**—Extending completely around the pool, a pipe gallery gives ready access to all pipes and fittings—except those for underdrainage—for maintenance and repair. The gallery is 5 ft wide and variable in height.

Inside walls of the gallery are the concrete pools walls; the outside are concrete block which support the pool deck. At the deep end of the pool, the gallery is floored with concrete to give a 5-ft height. The remainder is paved with crushed rock.

Support for influent and effluent piping are concrete block. These are laid so that all pipes drain by gravity. All pipes are wrought iron.

Architecturally, the bathhouse is pleasing to the eye, indestructible from the standpoint of fire and vandalism. It is also economical in first cost and for maintenance.

The long one-story structure has walls of architectural concrete to harmonize with the pool. Horizontal pour lines become part of the architectural treatment. Wall and roof slab surfaces were formed against resinous faced plywood. Tie rod holes are filled and all surfaces are finished with grout and cleaned down.

High windows provide light and ventilation in dressing rooms.

The focal point of the bathhouse is the large room entrance. A cantilevered slab over it supports on its edge the words—Municipal Pool—in large stainless-steel letters.

• **Bathhouse**—Symmetrical around a center entrance, the middle section of the 44,000-sq ft bathhouse houses a lobby, clothes basket room and office and first aid station. The lobby is restricted to 1,885 sq ft to minimize loitering—divides the male and female dressing quarters. A transverse counter separates it from the basket room. Entrance to dressing quarters is through crash-proof turnstiles.

The basket room is divided longitudinally into three aisles giving access to six rows of racks with more than 1,000 baskets.

The office and first-aid station are at the rear of the basket room directly adjacent to the pool.

The men's dressing room is open but the women's has dressing booths for semi-privacy.

Both dressing rooms feature clean mechanization of patrons a forethought that makes for better bather cleanup (see plan).

After depositing clothes filled baskets at a service counter, swimmers are routed past toilets and into showers. Entrance to the pool is only from ends of shower rooms.

Returning swimmers re-enter the bathhouse by a corridor next to basket storage, pick up their baskets and go directly into the dressing rooms.

Separate wet-entry toilets are in each dressing room. Toilets are also provided for spectators.

• **Engineers and contractors**—The project was designed and construction supervised by Alden E. Stilson & Associates, Ltd., Columbus, Ohio. General contractor was Carl J. Conradt & Sons, Inc. of Hamilton.

SCHEDULE OF FEES

(per swim)

Children, 16 yrs and under	$0.20
Adults	.35

(Fees include 20% for federal tax)

No reduction is given for season tickets

DESIGN AND ENGINEERING DATA

The North Side swimming pool, Hamilton, Ohio

Location: Residential district, public park; three direction main access roads; public transportation available; adequate parking space for cars.

Capacity: 1,000 swimmers maximum, based on 25% of city's 60,000 population in the immediate vicinity plus 10% of remaining population. Load equals 5% of 20,000 total contributing population.

Size of pool: Surface area—75.08×150.08 ft or 11,268 sq ft; depth of swimming area—3.5 ft; depth of diving area—5.10 ft; maximum water content—400,000 gal.

Deck area: 9,100 sq ft of 15 and 20 ft wide concrete walks at pool level; 4,000 sq ft sun deck on roof of bathhouse; concession area at pool level; 2 one-meter and 2 three-meter diving boards; chairs for twice-a-day load.

Recirculation: Continuous recirculation of water; 24 submerged adjustable inlets; surface and bottom drawoff; 6.67 hr turnover; 8-in. hair and lint basket type catcher; rate of flow indicator; 4-in. type metering; magnemeter; 15-in. scale; 0 to 1,360 gpm range. One 5-hp single stage centrifugal pump with 116 ft total dynamic head; 1,000 gpm capacity; and 3,450 rpm; 5,750 gpm electric motor; electrical control—220 v, 60 incoming line with protective relays; motor controls; meter and lighting switches in wall cabinet. 300 gal 42-in. diam make up tank.

Filters: Two 42-in. diatomaceous filters, each with 500 gpm capacity. Minimum backwash rate—40 gpm per sq ft per min. Floor space and ceiling height for units—60 sq ft and 9.33 ft. Operating weight per unit—8,500 lbs. Shells—36 in. high; 100 psi working pressure; tank—quality steel and removal head. 450 bronze wire wound 3-in. dia by 33-in. long tubular filter elements per unit. Filtering area—100 sq ft per unit. 18-in. diam × 36-in. makeup and precoat tank for diatomaceous earth slurry with continuous feed by auxiliary pump. One 1.2 cfm 150 psi air compressor for element cleaning aid.

Chlorination: One chlorinator with 60 lbs per 24 hr. capacity.

Bathhouse: One-story architectural concrete; 35×115 ft in plan. Men and women dressing, toilet and shower rooms. Clothes storage space with 1,000 baskets. Office and first-aid rooms; spectators' toilets and concession stand. Water treatment equipment room. Brick partitions. Windows 6.5 ft above floor, partitions same height for improved ventilation of dressing and service rooms. Crash-proof turnstiles at entrances and exits to dressing quarters. Wet and dry toilets for both dressing rooms; showers and benches in men's section and individual dressing booths and shower stalls in women's quarters. Three 150-gal electric heaters for shower water; total capacity 450 gph from 60-120 deg F with provision for 50% overload.

Construction cost: $165,000.

Cheap Model Helps Field Men Understand Job

Visualizing plans for the complex intake chamber of Neversink Reservoir was likely to be a tough problem, even for old hands at sandy rock excavation.

But job men came up with a solution. They built a model—not the elegant kind that sells big ideas to voters and boards of directors—a model made up of drawing paper, cardboard and mailing tubes.

The full-scale object of this model-making, the intake chamber, now is being carved out of rock in the left bank of Neversink River, a short distance above near-finished Neversink Dam. The dam will impound the first Delaware watershed water. Delaware water supply project ENR Jan. 6, 1949, p. 60), to serve New York, 100 miles southeast. Water will go through the chamber and pass into the Hudson watershed, through 63-mile Neversink Tunnel.

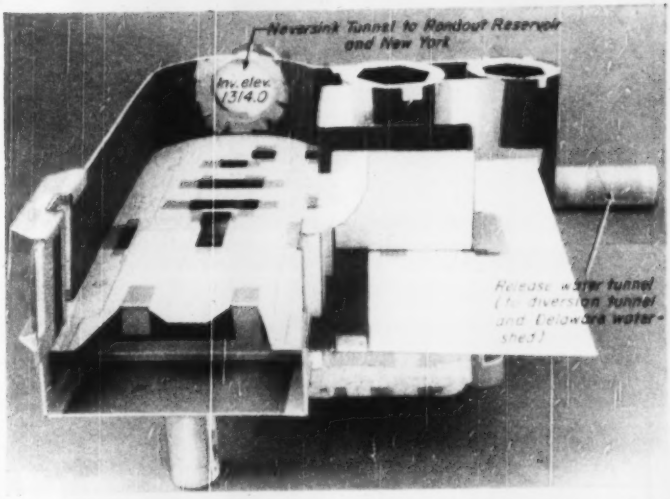
In addition to controlling flow into Neversink Tunnel, the intake chamber must control a constant minimum release of water to Neversink River below the dam. This extra duty is what makes the chamber so complicated.

Foreseeing plenty of misunderstanding if they toted in sheet after sheet of plans alone, the contractors and engineers decided to build the model. H. E. Snowden, general superintendent for contractors Frazier-Davis, is hands with scissors, paste and tape, referring to about fifteen drawings, he cut out and assembled the model.

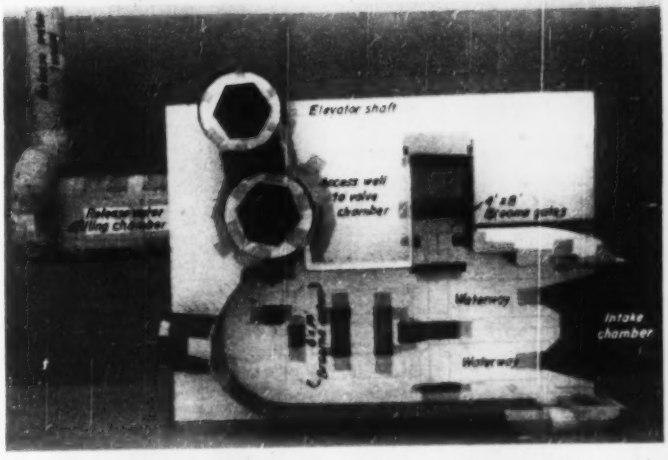
Cut-to-cut volumes represent rock excavation. Concrete and steel construction are represented partly by drawings on the model and partly by the interim build-up on the model.

Once built, the model was checked by engineers and supervisors, whereupon it became Exhibit "A" for construction superintendents, whenever they wanted to know "what next?" In addition, photographs of the model were lettered, as shown here, and posted in various places where construction men could see them.

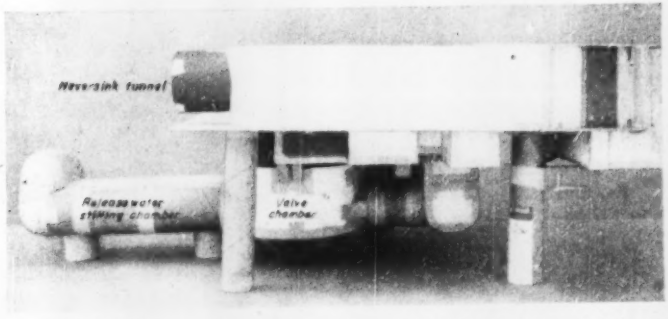
Neversink division engineer for the owner, New York Board of Water Supply, is Frank Misso.


Neversink Tunnel to Randout Reservoir and New York
Inv. elev. 1314.0
Release water tunnel (to diversion tunnel and Delaware watershed)

OUTFLOW CONTROL CHAMBER construction at Neversink Reservoir is easier to understand, thanks to this job-made model. Cut-to-cut volumes represent rock excavation.



MAILING TUBES, cardboard, drawing paper, and tape are the model's chief materials. Plan view shows how drawn-on information supplements scale volume information.



ROCK EXCAVATION at lower levels (side view) is for release-water control. Columns merely support model. Structure will be 130 ft below ground. (BWS photos)

A Banker Tells the Why and How of . . .

Bank Financing of Equipment

E. I. H. Bennett,

Vice President, Peoples First National Bank & Trust Co., Pittsburgh, Pa.

FOR MANY YEARS, the financing of construction equipment was viewed by many bankers with a very critical eye. They felt—without real justification—that this kind of financing was extremely hazardous, that it was not a bona fide banking function and that the risks more than offset the profit potential.

Recent developments, expressed in terms of favorable experience (which is due entirely to improved methods on the part of the lender) have radically changed that concept. Today, the financing of heavy income-producing equipment is clearly recognized as not only a sound banking function, but also a very important one.

The success or failure of any phase or type of lending depends almost entirely upon the basic policies observed and the care exercised by the lending institution. Even financing of home improvements under a government insured plan can carry with it a great deal of risk if sound credit principles are ignored and if proper selling practices are not observed.

Because of the substantial amount of credit required when we finance construction equipment, the importance of observing sound practices becomes obvious in this specialized field. There are many points to watch, the most important of which I believe may be briefly summarized as follows:

1—Dealer selling methods. In this stable industry, selling policies and practices are certainly well above those found in certain other fields. However, we do find a tendency, at times, for dealers to high-pressure the customer into a piece of equipment not at all suitable for his needs, with the result that the customer is later dissatisfied. On other occasions, the dealer may overcharge the customer or misrepresent certain facts, and this, too, creates ill-will. While such cases are certainly the exception, they do occur, and we feel that, as a primary requisite, we must insist and rely upon sound, reputable selling practice on the part of the dealer.

2—Purchasers financial status. We are frequently asked, why we place so much emphasis on the financial condition of the purchaser, we have a lien on the agreement, so isn't that ample collateral? The answer, of course, is no. We would not be considered a sound credit institution if we financed a Cadillac for a $25 per week office boy, or if we approved a mortgage on a $50,000 home for a $50 per week laborer.

Equipment financing has analogous situations. And we must look to financial stability, financial ability to pay and general character to determine whether we can expect repayment under reasonably normal conditions. On contracts of less than $10,000 we rely on direct investigation, and seldom require detailed financial statements, but on larger deals such data are required in sufficient detail to enable us to form a firm opinion and arrive at a prompt decision. With this, we must consider also the business in which the purchaser is engaged.

3—Repayment requirements. Having established satisfactory dealer relations and determined the satisfactory status of the purchaser, the next important consideration is the terms of sale and repayment. What down payment is to be made, and over what period of time will repayment be made? In order that the buyer may have something in the deal to give him a greater feeling of responsibility, require that he pay, in advance, at least 25% of the net selling price, in some cases we insist upon 33⅓%. That is standard. There is little question about down payments in those proportions.

On the question of maturities or length of contract we follow a conservative pattern and require repayment generally, over a period of 12 months. On this, however, there is less standardization than on the question of down payment, for we should and do consider the *ability* of the buyer to make rather heavy monthly payments. How long will the job last? How much income will be produced by that piece of equipment? Will monthly payments on a 12 month basis leave him short of much needed working capital? When we analyze it in this way we frequently find that an 18 month payment schedule is far more desirable, and we have had some cases where we have stretched it out over a 2 year period. Flexibility on this important question should be one of the characteristics of the lending policy.

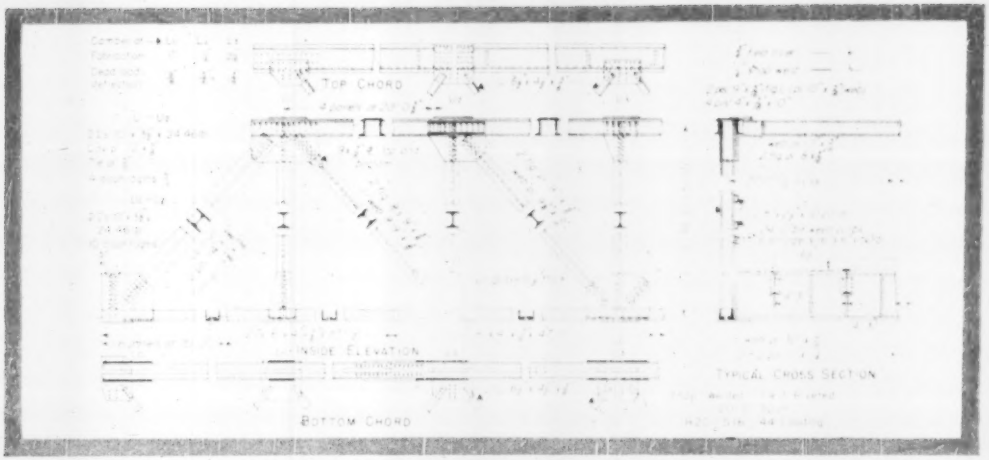
4—Lien instruments. An important consideration in this specialized field is the type of lien instrument used. Unfortunately, that cannot be discussed here because of the wide variance in state laws. It is an important phase of financing, however, the bank must make a careful study, through competent legal counsel, to determine the proper instrument, the filing or recording requirements and the bank's specific rights in other states if the equipment may be moved out of its local jurisdiction.

5—Collection. The lending institution, if it is to be successful in this or any type of installment financing, must observe sound, firm, but fairly flexible collection policies. Prompt follow-up for delinquent installments is absolutely essential, for failure to act quickly may result in a substantial loss. The contract is specific as to dates and amounts of payments, and we feel that we should insist upon strict adherence to that contract.

It is recognized, however, that unforseen conditions arise that make it impossible for the borrower to fulfill his promise exactly as agreed. If we are given the facts, we have made our plan flexible enough to make exceptions, grant extensions or even refinance the equipment to fit the circumstances. We believe this to be very important, for we constantly keep in mind the need for maintaining good customer relations, not only for the bank but also for the dealer. Whatever we do, good or bad, reflects on the dealer and we want to keep the good-will of the dealer at all times.

It works. By keeping these five major factors clearly in mind, we have found it possible to handle this type of financing on a profitable, attractive basis and in a way that has made this an important part of our banking services. There are other problems, to be sure. One of these is the question of dealer recourse versus non-recourse. On new equipment, where values are fairly standard, and where we are dealing with reputable, well-established dealers or distributors, we handle the paper on a non-recourse basis. On used equipment, however, where we do not always have firm values, we require full recourse on the dealer. Another question is that of finance charge. Our standard charge is 6% per $100 per year, a rate which is competitive and fair when we properly evaluate the risks.

We have been engaged in this field on an active basis for about five years, and we have had an opportunity to study thoroughly its advantages and its disadvantages. It all resolves down to the elementary basics of sound lending—character, capacity and collateral.

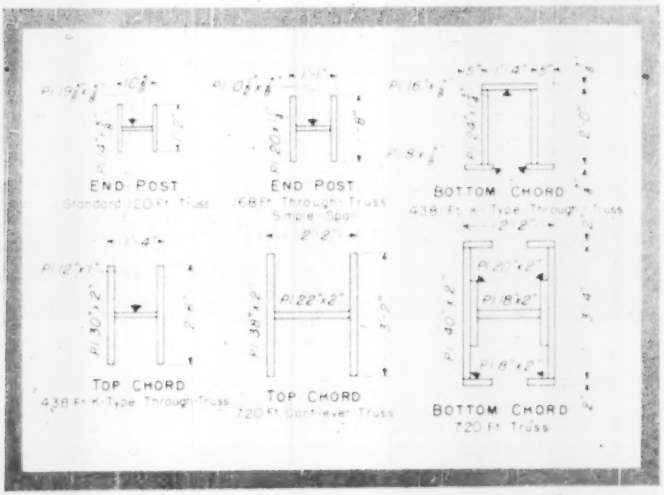


Welded shop fabrication plus riveted field erection is current practice in . . .

Australia's Welded Highway Bridges

V. Karmalsky
Design Engineer, Department of Main Roads, New South Wales, Sydney, Australia

FOURTEEN YEARS ago the Department of Main Roads completed, or under construction at Main Roads, N.S.W., was constructing 2 being designed and 2 proposed, designed and built its first welded highway bridge, a 100-ft span over [illegible]. Of the 14 completed bridges, the Macdonald River at Bentabo Street's most notable one is the Hawkesbury River, all the department's major bridges [illegible] bridges have been welded. The [illegible] 438-ft



TRUSS MEMBERS in shop-fabricated, field-welded bridges are made up of plates ranging from ¼ in. thick in a standard 120-ft span to 2-in. for 720-ft cantilever span.

Kaipo through truss spans (longest welded trusses in the world) and nine 200-ft welded plate girder spans.

One of the proposed bridges is a long cantilever bridge at Gladesville, over the Parramatta River. The centre lever portion will be made up of two 240-ft anchor spans, two 240-ft cantilever arms and a 240-ft central suspended span. Two 144-ft simple deck truss spans will flank the anchor spans at each end of the bridge.

Welded bridge construction in Australia does not necessarily mean "all welded". The Barraba bridge is only all welded truss bridge in country.

Other truss spans are shop-welded and field riveted. Simple span plate girder bridges are all welded, but continuous girders are shop-welded and field riveted. Likewise, towers of lift bridges are shop-welded and field riveted.

Australia continually improves its design and construction of welded bridges by four means: (1) Coordination between design and shop practices; (2) Lessons learned from overseas failures of welded bridges (there have been none in Australia); (3) Criticism of faults in welded designs by opponents of welding; and (4) A study of world welding literature.

A number of conservative Australian designers still prefer riveted work and oppose welded construction, their arguments being based chiefly on the failure of a few major welded undertakings in other countries. Proper analysis of the causes of these failures, however, actually gives the designer every reason to be more confident in welded bridge construction.

Summing it all up, there are about seven principal considerations in the design and construction of welded steel bridges. They are: (1) operation

of steel; increased stresses due to "notching"; fatigue of metal; rapid cooling of weld metal; stresses due to weld being restrained from contraction on cooling; distortion of steel due to welding; and proper reduction of permissible design stresses. The author recently discussed these considerations in detail in a lecture before the Australian Welding Institute of which this article is an abstract.

• **Composition of Steel:** A certain limit must be placed on the carbon content of steel to make good weldability; carbon in steel increases its ultimate strength but reduces its ductility. The maximum allowable carbon content in welded structural steel, specified by the Standards Association of Australia, is 0.3%.

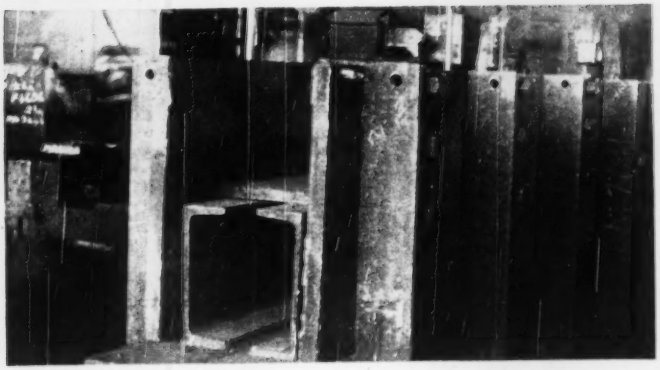
Other elements present in the steel also reduce its ductility, but to a lesser extent than carbon. For example, six parts of manganese are equivalent to one part of carbon in hardening the steel. The total amount of these substances, when reduced to the equivalent of carbon, should not exceed 0.4%. Otherwise, the welds tend to develop cracks unless special precautions are taken.

• **Effects of Notching:** Additional stresses are introduced in the weld or in the parent metal by notches in the structural member. A "notch" is any discontinuity in abrupt changes of section, incident of the weld, cracks, pinnate and inclusions in welds.

Notch effects in welded work are not as well known as in riveted work (section changes, rivet holes, etc.), but with proper precautions in design and construction no failures are likely to occur from notching in welded construction.

In the case of an oblique welded plate under precautions against notche effects can be taken by locating butt-splices of the flange plates some distance from the center of span. This will avoid high bending stresses. Likewise, butt-splices of web plates should be near the center of the span to avoid high shear at the supports. No undercutting can occur in these welds, and cracks can be easily detected since all butt-welds are built up to 10% in excess of the required section, and ground smooth.

• **Notch Sensitivity of Steel:** A certain quality of steel tending towards a brittle fracture in the presence of notches in the member is called "notch sensitivity." This quality is likely if the manufacturing process or subsequent heat treatment produces a microstructure in the steel known as "martensite." In this condition, the steel consists of thin elongated crystals (dendritic structure) produced by rapid cooling. Extreme cold seems to aggravate the notch sensitivity of such steel. This problem does not exist, however, with Australian-made steel; probably due to the absence of severe freezing temperatures.



SHOP WELDING: a heavy truss member (20x1¼ in. flanges and 16½x⅜ in. web) for a 168-ft simple span. Plates are tack-welded in an assembly jig.

• **Fatigue of Metals:** The well-known phenomenon fatigue of metal due to cyclic stressing is an important factor in the design of either welded or riveted bridges. Because of this factor, permissible stresses for welded work in Australia are usually reduced. The amount of this reduction is based on the relative magnitude of maximum and minimum stresses in the members and the number of cycles occurring during the estimated life of the bridge.

• **Rapid Cooling of Weld Metal:** Another factor contributing to reduced ductility of the weld metal is its rapid cooling by a large mass of parent metal. The thicker the plates being welded, the more rapidly heat is absorbed from the weld. This causes brittleness of the weld.

As a precaution against serious effects from too rapid cooling of welds, Australian bridge practice specifies the minimum area of weld run for any given thickness of plate. For example, fillet welds are required to be at least ⅜ in. nominal size for plates ½ in. thick and over.

Special attention also is given to the equivalent carbon content of the steel. If it is excessive, preheating and postheating of the parent metal are required.

Other precautions are the size of electrode and the amount of electric current. Both are strictly controlled. Excessive current gives high local heat which is deleterious; low current permits too rapid cooling of the weld by conductivity with the parent metal.

• **Contraction on Cooling:** Prevention of the contraction of a weld on cooling also produces high initial stresses. This is a common fault in welded structures, yet one that is obvious and easily understood.

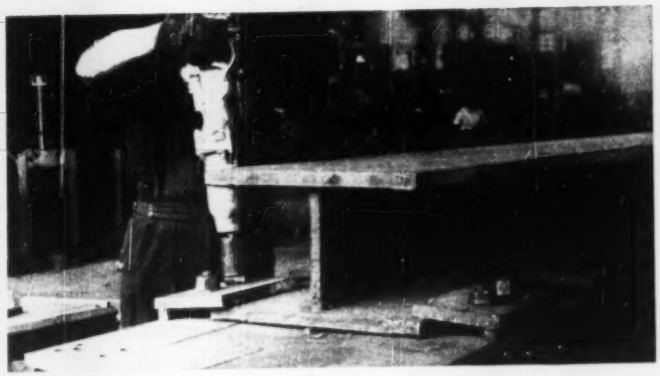
This is how it works: The metal deposited in a butt weld cools to normal temperature. In the process of cooling, its volume is reduced. If the two plates being butt-welded are free to move on a welding table, contraction of the weld metal will pull them together. If the plates are not free to move, the weld must crack or at least yield.

One method of avoiding this effect of contraction on cooling is shown in the Australian practice for welded plate girders.

Web plates made by butt-welding short sections and flange plates are completely welded full length individually, prior to assembly. During this operation all welds are free to contract.

The completed flange and web plates are then assembled together with stiffener angles. The assembled members are first tack-welded, then completed by continuous fillet welding.

Butt-welding of rigid sections should be avoided as it must result in restrained shrinkage of the welds. This is especially true in butt-welded connections of continuous rolled beams. If the flanges are welded first, contraction of the weld metal will draw the two halves of the beam together. Then when the web of the beams are butt-welded, that weld material will be restrained from shrinkage by the previously welded flanges. This will give large tension stresses, causing cracking during cooling or as soon as the beam is in service.



FLANGE PLATES then are prebent over a ½-in. packing strip before making ⅜-in. fillet welds between web and flanges to insure straight flanges after fabrication.

• **Distortion Due to Welding** Distortion of members and their components due to contraction of the weld metal must be carefully considered in the design and fabrication of welded structures. Two measures may be taken to avoid, or at least relieve, stresses due to the contraction of the weld metal. Welding must, if possible, should be balanced by symmetrical positions in relation to the unit being welded. If the member is built up from separate plates, the welds should be placed symmetrically in relation to the whole section.

The simplest example of this procedure is a double V butt welded plate. Runs of welds are placed symmetrically on both sides of the plate. This equalizes tension stresses in each V, caused by cooling of the weld metal. Since the stresses are balanced, the plate will remain flat after welding.

Another example (Fig. 1) section represents a symmetrically welded built-up section. Since the four welds are symmetrical about the vertical and horizontal axes of the member, it will be straight after completion of the welding.

Unsymmetrical members such as top chords of trusses made up of two channels and a cover plate present another problem. Welding is required only to connect the channels to the cover plate. These welds, not being symmetrical about the horizontal axis of the member, will produce bowing of the member. To avoid this bowing, the components should be prebent as in Fig. 2, and welded in this position. Shop experience only will be able to determine the amount of prebending needed for various unsymmetrical sections and different sized welds.

One word of caution however. The fact that there is no resultant distortion of a welded member does not indicate that there are no initial stresses in the welds. Elimination of this distortion by balancing the welds does not reduce these initial stresses. They must be considered in the design.

• **Reduced Design Stresses** Ever since the N.S.W. Department of Main Roads designed and built its pioneer welded truss bridge 14 years ago, it has followed conservative design specifications. Allowable working stresses for butt and fillet welds are 75% of stresses permitted in the parent metal. Also, butt welds in direct tension members can be used in direct tension only under dead load. Butt welds in members subjected to bending stresses may be stressed in tension by bending.

These conservative specifications do not seriously affect the economy of welded bridges as might be expected for the following reasons. In bridge trusses the length of steel shapes supplied by the mills is sufficient for all truss members to be fabricated without splices between panel points. Welding is used only in the longitudinal direction of built-up truss members. Field connections of trusses are riveted. Cover plate girders all butt welds are placed at positions of low stress, since no increase in sections are needed.

• **Sequence of Welding** A sequence of welding for built-up I sections that is the principal one used has been developed that causes straight members requiring no correction by press or heating.

The I section, assembled by tack welding, is laid down on the welding table, with the flange plate prebent over the packing strip (Fig. 3). Two welders, opposite each other, work from the center of the member to the back step method, i.e., weld one, miss one. The length of each run is equivalent to the use of two electrodes. Instead of returning to the center and finishing the "misses" the member is turned over and clamped over the packing strip, the welders weld the second flange as the first, then return to the center and finish the "misses". The member is then again turned over, and clamped down over the packing strip, and the weld of the first flange completed.

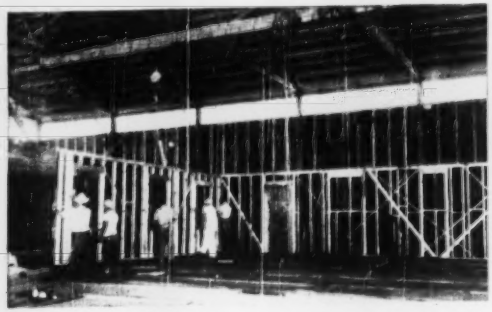
• **Savings by Welding** Close study of designs, contract bid prices and construction techniques during the development of Australia's welded bridges revealed four main savings by welding. They were: Utilization of gross sections for tension members; better distribution of metal in compression members; elimination of costly facing for upper chords and end posts; and no deductions necessary for rivet holes in flanges of cross girders.

An indication of the saving by all welded or shop welded field riveted, against riveted construction, may be gained by the result of alternative tenders for the first two welded truss bridges designed by the department in these three types of construction. To obtain a fair comparison, all designs were made by the same engineer, the author.

The saving in weight of the all welded over that of the all riveted structure was 20%, and in cost 13%.

The saving in weight of the shop welded field riveted over that of the all riveted structure was 16%, and in cost 13%. It may be mentioned here that the department's latest standard truss bridges, designed for Australian loading H20-S16, show a saving in weight, by shop welded field riveted construction, of 17% over the latest all riveted equivalent. The saving in cost, however, should exceed the saving in weight as recent quotations show that the manufacture of welded members per ton is now less than for riveted members, owing to the advancement of welding methods in Australia.

The reasons, however, for the decision to adopt the shop welded field riveted construction instead of the all welded, were based on the following considerations. The department demands full assembly of all steelwork in the shop, and rivet holes for field connections facilitates this assembly, the quality of field welding, done under inferior conditions, compares unfavorably with shop welding, and supervision of field welding is more expensive than for riveting. Finally, to weld connections of large members without distortion presents many difficulties in the field.



1 Wall panels swing into place as house construction gets under way in a Mobilhome factory assembly line.

2 Complete, with siding, inside finish and equipment, the house moves along over rollers to the end of the line.

Homes Roll off the Assembly Line

Assembly-line home construction is the hub of a purchasing, building and merchandising system that is making a strong bid for a large share of the small and medium home-construction business. Working under a license arrangement with the parent concern, Mobilhome Corp. of America (Bakersfield, Calif.), firms in various parts of the United States have started assembly lines in operation.

Economy in construction is obtained by the same crew doing the same job at the same place each day, by standardization of materials and by mass purchasing. These economies more than reduce the cost of hauling the completed structures to the purchasers' lots.

According to the builders, greater economic advantages are being developed as experience and know-how increase. These advantages are compounded by integrated group procurement, standardized plans, uniform cost accounting, package financing of houses and fast, end-production at a peak level.

The Mobilhome system, say the builders, overcomes the obstacles that have plagued other methods of mass production. Such hurdles as code differences, labor troubles, financing and local politics seem to be surmounted. All lending institutions, including FHA, have readily accepted the principle involved.

Several different floor plans are available. These run from a one bedroom house with 672 sq ft of floor space that costs $4,700 in Bakersfield to a three-bedroom home with 1,344 sq ft of floor space costing $8,150. This price does not include land but it does include foundations, walks and delivery within a 10-mile radius.

• **Assembly line**—The assembly line is the hub of the entire system. On it there are about ten stations, at least four or five of which are under cover. By the time the house emerges into the open it is completely enclosed and may even have a heating unit in operation.

Each house is left at each station one working day. Thus, on a 5-day week basis, a house is built in 2 weeks.

Two steel channels are mounted on parallel rollers set in concrete. At the first station of the assembly line, 2x12 floor joists, 16 in. apart, are laid across these channels. Diagonal reinforcing is effected by 14-in. wide steel straps nailed to the joists. Similar straps are also used in the walls.

Next step is to cover the entire floor with 2-in. hardwood flooring. In areas where the climate is colder than California, double flooring is used. The hardwood flooring is sanded on the spot and then covered with heavy kraft paper for the duration of the construction period.

At the No. 2 position, pre-assembled walls and partitions are installed. These are built flat on jigs next to the assembly line and moved into place by an overhead crane. At the same time, the plumbing rough-in installation is made and exterior work started.

At Station No. 3 the roof framing is installed and plumbing and wiring work is advanced.

At Station No. 4 the roof is usually shingled, is placed. Plumbing and electrical work are completed. Here the gas furnace is also installed so that when the house emerges into the open the main gas work is ready to connect and paint will dry quicker. Also at Station No. 4 the outside of the house is given a prime coat of paint and window frames and doors are installed.

At Station No. 5, the house now emerges from under shelter. Here the dry wall installation is started. This involves nailing wallboard directly to the wall studding and pasting paper strips over the joints. The entire wall is then given a thin plaster coat and almost any desired plaster-type finish can be made.

At Station No. 6 the inside-wall finish is completed and the house is given a second exterior coat of paint.

At Station No. 7, the door frames and cabinet work are installed. Also at this point interior trim, tile and linoleum go in.

Station No. 8 involves interior painting and the third coat of paint on the outside.

At Station No. 9 all painting is finished and hardware and electrical fixtures installed.

Station No. 10 is used for inspection and preparation for moving.

During the time a house is on the assembly line, Mobilhome workmen are preparing the lot to receive the house. This involves foundation and sidewalk construction and establishing utility connections.

• **Moving the house**—When a house is ready to go, the house-moving subcontractor takes over. A low bed truck is commonly used to haul the new house to its permanent location. In some cases foundations are built so the truck can back between them. Then the house is jacked up and after the truck pulls out the house is lowered in place.

Almost all the Mobilhome licensees have an established house moving firm for the moving work. Such firms have equipment and know-how and are thoroughly familiar with local conditions pertaining to their business.

In Texas and California these houses have been hauled as much as 200 miles. Old engines that have

3 Truck-trailers operated by professional movers transport the house to the purchaser's lot where . . .

4 Foundations have already been prepared. House is jacked from trailer and lowered into place

purchased units for their field drilling crews have moved them to new locations one or more times with no apparent damage. From San Diego, Mobilhomes have been barged to Coronado Island.

A variation in hauling methods is required in Sacramento, Calif., where there are many bridges in and around the city. A truck-trailer unit has been developed with jacking equipment so that when the trailer approaches a bridge the house is picked up so it will clear the bridge railing. On the other side it is lowered again to clear telephone wires, etc.

• **Subcontractors**—Much of the other construction work is also done on a subcontract basis. In this regard a Mobilhome assembly line operation is much like any general building contract. Subcontractors are commonly involved on the following work: electrical, plumbing, tile and linoleum and painting.

Workmen are hired just as they are on a general building contract. The union agreements and wage rates that are prevalent in the area are observed by Mobilhome operators.

Workmen seem to prefer Mobilhome work. It is usually a lot more regular than run of the mill construction jobs, and the work location is fixed. This helps reduce costs by assuring an experienced crew.

• **Preliminary planning**—Considerable study went into development of the house plans. For example, almost all lumber used comes from the supplier precut to standard lengths. Thus little on the job cutting is necessary and when it is, it is done in a shop using power tools.

The originators of the Mobilhome system operated for more than two years before awarding the first franchise. During this time, and continuously since, the plans have been improved. Now the two-story floor plans are effective use of materials and produce a livable, efficient home.

Structurally, these homes are stronger than the average small home, since some extra strength is built in to resist moving stresses.

Inspection of the building work is also facilitated. Inspectors can conveniently view the work at any stage of the assembly-line process. The Mobilhome people report no building code conflicts.

Many advantages obtain in favor of the purchaser of a Mobilhome produced home. For example, the purchaser can select his own color scheme. Further, there are several floor plans and many exteriors to choose from. By purchasing the lot separately, the purchaser is assured of the type neighborhood he wants. He will not have to move into an area of many similar houses as in a tract-type development. Another advantage is that the house can be delivered in 2 weeks so there is no long waiting period. Of course, there may be a large backlog and the purchaser would have to wait his turn. However as the backlog becomes large enough, a "second assembly" line can readily be installed.

On the part of the builder-contractor advantage is that there is no tremendous investment in property. Under the tract-type home development, money is tied up in land for 6 months or more before homes can be sold. Under the Mobilhome arrangement, a down payment is made when the home starts down the assembly line, this payment nearly or about

> "The Mobilhome program, functioning under a unified administrative contractor, almost can't help to produce a revolution in the construction of small dwellings within the next five to ten years."
>
> Hugh Curran, President
> Mobilhome Corp. of America

$500. Final payment either in cash or through a financing arrangement is made on delivery at the home. This is in 2 weeks from the time the house starts down the line. Thus the builder gets his full investment back even before he has had to pay for materials, men and subcontractors.

The Mobilhome people estimate that it takes from $50,000 to $100,000 to set up a Mobilhome assembly line. To break even, sales should total about 70 houses a year. As many as 250 houses can be produced from one assembly line in a year.

• **Background**—The system was developed by Hugh Curran, Bakersfield, Calif., contractor, over a period of several years. Curran says that Mobilhome has an advantage over other similar schemes in the know-how built up during the development period. This know-how is part of the service rendered by the parent company under the franchise agreement.

Franchise terms involve payment of a flat fee plus 1½% of gross sales. For this a builder gets use of the company's patents, trade secrets, trade mark, continuing operational help, financing and procurement assistance.

Under this scheme, franchises have flourished in many West Coast cities, particularly in California. There are several plants in Texas sponsored by the Longbell Lumber Co. In the Midwest, plants have been established in Milwaukee, Chicago, Gary, Minneapolis and St. Joseph—so far.

Curran hopes eventually to have 250 active franchises in existence.

Different areas of the country require slight modification of the standard Mobilhome process described in the foregoing. For example, in Milwaukee there can be no assembly line under one roof. This permits full scale work throughout winter months. Also in Milwaukee houses must have a basement, which requires more on the site work.

Air in Earthfills Assures Stability

E. R. Hallett
Los Angeles, Calif.

SPECTACULAR earthfill failures have been caused by too much water in the fill. But when earthfill voids contain air as well as water, failure is not likely to result in a properly constructed fill.

Moisture and air content can be controlled when a fill is placed. But addition of fill material may increase the pressure so all the free air becomes absorbed in the water. This changes a well-made fill to a supersaturated condition and failure may result. Charts for field use that forecast this possibility have been developed by the author and are the subject of this article.

These charts were developed after a suggestion by R. R. Proctor and Loring E. Labor of the Los Angeles Department of Water and Power. The author was employed as a field engineer on construction of the Baldwin Hills reservoir by the city. Construction of that earthfill was checked by this type of chart.

• **Moisture content important**—In constructing a rolled fill one of the most important factors is the moisture content of the soil being compacted. The purpose of compaction is to make the fill so dense that failure by water saturation or other causes is not likely. For a given soil and a given method of compaction, a particular moisture content (optimum moisture content) of the soil will result in the most dense fill.

Compaction curves are drawn to determine the optimum moisture content. Unit weight (lb per cu ft) for several samples with different moisture content is determined to draw this curve. In all probability, no saturated samples will be used to prepare such a curve.

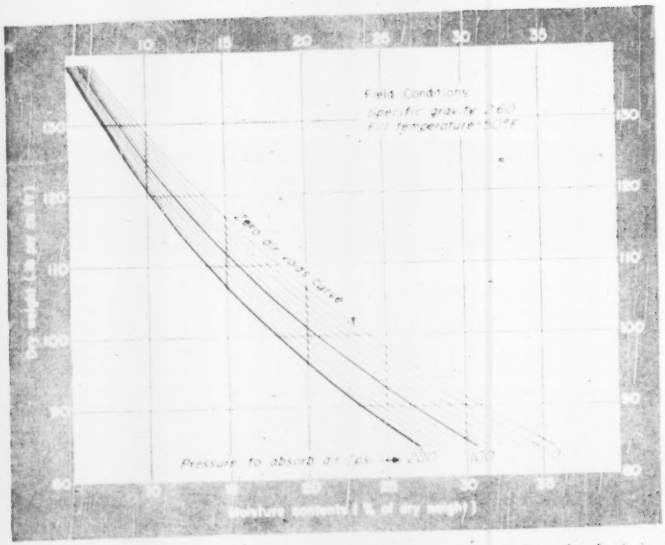
When a fill consolidates, the particles readjusting to decrease the voids as the fill rises, air and water in the voids are put under higher and higher pressures. With the pressure increased, air is absorbed by water until a saturated condition exists. The possibility of the air escaping from the fill under pressure is neglected in this discussion. Such an omission will usually be on the safe side. Then, as the particles further readjust so as to decrease the voids, the entire additional load will be carried by the incompressible water, and the pore pressure may become very high. The friction of the soil may thus decrease until a slide-out failure of a slope occurs. The charts developed by the writer are intended to predict without calculation just how great is the possibility of such a failure.

As rolled fills are constructed, a large number of field samples are taken to show conditions in the fill. Engineers can judge what future procedural changes seem wise. Simple laboratory tests on the field samples will give moisture content, unit weight as found in the fill and the specific gravity of the soil particles. These values together with an estimate of the temperature of the completed fill are used in the accompanying chart.

• **Using the chart**—For each combination of specific gravity and fill temperature, a separate chart is required. For example, if the specific gravity is 2.6 and the fill temperature is 50 deg F, the accompanying chart is used. The dry unit weight is plotted against moisture content. In most cases this point will fall within the group of curves plotted on the chart. For a 110-lb per cu ft sample with 17% moisture content, the plotted point falls on the third of the family of curves. This indicates that an additional pressure of 40 psi will be required fully to absorb existing air and result in a saturated condition.

For a field approximation, it may be assumed that increasing the height of a fill by 1 ft will increase the pressure by 1 psi. Thus, in the preceding example, an additional 40 ft depth of fill can safely be placed. But if more than 40 ft of fill is to be placed, a dangerous condition may develop. Here the part of the weight of the additional fill supported by the soil skeleton is neglected, this being the side of safety.

To correct this condition, the engineer must attempt to reduce the moisture content of the soil that is subsequently rolled. Note that a reduction from 17 to 15% in our previous example will permit pressure to be increased to 140 psi. If good compaction can be secured with a lower moisture content, the safety of the fill may be increased by this means. If good compaction cannot be obtained in the course of reducing the moisture content, then more accurate calculations


Field Conditions
Specific gravity 2.60
Fill temperature 50°F
Zero air voids curve
Pressure to absorb air (lb. per sq. in.)
Moisture content (% of dry weight)

CHARTS such as this can be developed to predict pressure required to absorb air in a fill. This one is for a 2.6 specific gravity and a 50 F fill temperature.

of the pore pressures that may be expected to develop must be made. It may be desirable to install piezometers if they are not already required to determine actual pore pressure.

In some cases, pore pressures developed by consolidation will be dissipated through the fill if sufficient time is allowed. The field engineer in such case can reduce the rate of construction so that a dangerous condition does not develop.

It is conceivable that it might even be necessary to redesign the structure to secure safety if field experience and office calculations indicate a dangerous condition zone that cannot be relieved by reducing moisture content or slowing down rate of fill.

• **Consolidation computations.** Accurate calculations of consolidation where the soil is not saturated (and where both a water and an air phase must be considered) are apt to prove difficult. The Terzaghi theory of consolidation uses the Darcy formula to calculate the additional amount of water that will be squeezed out from the soil. This is then made equal to the decrease in volume of the soil. Terzaghi's theory assumes (1) the complete saturation of the soil, (2) the validity of the Darcy law, (3) a constant coefficient of permeability, and (4) one dimensional flow (upward). These may not always be true.

Modification of the Darcy formula by assuming polyphase flow involves the use of equations quite difficult for a field engineer to handle in time to be of any value to him in controlling the placing of a rolled earth fill. Thus, it appears that the alternative to the use of a chart such as presented here is to make no attempt at all to prevent rather high pore pressures by controlling the rolled earth fill while it is being constructed. To attempt ultimately to place the fill in a relatively dry state as regards pore compaction, and use of the charts may indicate that it is not necessary to do this.

• **Basis of the chart.** Computation of the chart involves the degree of saturation, S, which is the ratio of the moisture content of a soil to its moisture content at full saturation. The curves on the charts correspond to certain degrees of saturation where S is less than 1. The curve marked 100% corresponds to S = 1, or 100% saturation.

For each specific gravity, a plot of unit weight against moisture content can be made for a saturated condition. The other curves on each chart are computed by using Henry's Law that states that for a given temperature the amount of gas which a liquid will absorb is directly proportional to the pressure of the gas. Thus, for a given saturation, S, a curve can be drawn that is roughly parallel to the saturated condition curve. It then remains to select the saturations that will exist pressures of 20 psi, 40 psi, 60 psi, before a saturated condition exists.

Short-cut methods can be developed to simplify the plotting of these curves. For example, the entire series for a given temperature can be plotted against two horizontal scales, each scale representing a particular moisture condition.

Notes on Legal Decisions

Summaries of decisions relating to construction prepared by I. Vernon Werbin, counselor at law and engineer, New York, author of Legal Phases of Construction Contracts (McGraw-Hill)

Delayed Performance

"It is generally held that a provision for liquidated damages for delay in the performance of a contract will be enforced provided the delay is not due in whole or in part to the fault of the party claiming the benefits of such provision. In other words, where delays are occasioned by mutual faults the court will not ordinarily attempt to apportion the damages.

"Speaking generally, the measure of damages is such sum as will reasonably compensate the person injured for the loss sustained. In building contracts the loss resulting from delay in performance ordinarily is the rental value or the value of the use of the property, which varies according to the circumstances in each case. If such damages are uncertain in nature or amount, or are difficult of ascertainment, the contract may contain a provision fixing a stipulated amount which may be used to determine the amount to be paid as compensation in the event of a breach."

Architect's Compensation

"An architect is entitled to compensation for services rendered which he exercises the expected skill and diligence that is usual in that profession. If he fails to exercise such skill and diligence he is not entitled to compensation. If in the performance of their work they did in general exercise skill and diligence, but through an oversight or lapse caused some damage to the owner, then in a proper case the damages may be offset against the fee.

"Architects who prepared plans and specifications for a house in conformity with the instructions of their client, who did not set any cost limit, under an agreement that if the house was not erected the architects would be paid a percentage of the loss [illegible] are not precluded from payment because the low bid was in excess of what the client wanted to spend and the plans could not be modified so as to keep the cost of the house within the client's limit.

"Where an architect is employed to prepare plans for a building that is not to cost more than a specified amount, it has usually been held that the architect is not entitled to compensation unless the building can be constructed within the stipulated amount. However, where the architect merely gives an estimate of cost he will not be denied compensation because the cost of erecting the building for which he was engaged to prepare plans will entail an expenditure beyond the amount which he estimated would be required."

Cost-Plus Contracts

"In an action to recover a balance due on a cost plus contract, the contractor did not necessarily have to introduce in evidence his books to prove cost, but could show it by his testimony based on his personal knowledge and memoranda."

Substantial Performance

"The rule is of long standing that where a contractor or builder has in good faith endeavored to perform everything required of him under the terms of the contract for construction, and has in fact substantially performed same, he is entitled to the contract price, less proper deductions for unreasonable defects or deviations made by him, particularly where the owner occupies and uses the building."

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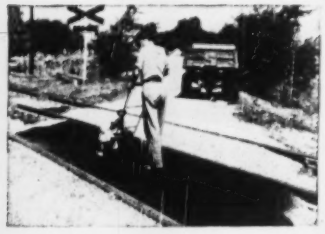

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READER COMMENT

Prestressing Safety Factors

Sir: Portland Cement Association bulletin RC No. 25 "represents" a commendable effort by the PCA to present protected concrete in a simple and understandable form to engineers who may not have the time to study the voluminous literature on the subject. The merit of the effort is partly offset, however, by the fact that, for purposes of demonstration, certain design criteria are chosen that do not necessarily reflect common zoning experts, especially as regards safety factors against cracking and against failure.

Before a legally binding code, or even somewhat permanent regulations can be prepared, the meaning of the term safety factor must be more clearly defined. With the conventional concept of safety factor as the ratio between ultimate strength and working stress, safety factors varying from 2.5 to 5 or more, used in a reinforced concrete structure, are obtained. These values result from design limitations that were arbitrarily chosen and do not properly reflect the resistance of the structure against failure.

Anticipated possible errors in calculations, variation in material qualities and the specified margin between design loads and maximum service loads, as well as frequency of overloads, must all be considered before specifying design requirements. In our opinion, a safety factor should be determined, rather than chosen, and the basis for its determination must be a rational evaluation of these considerations and of tentative loading stages.

In prestressed concrete design, it is particularly important to differentiate between safety factors at various loading stages, because due to ultimate changes in the concrete stresses vary with time. Also, methods of casting and erection often create critical stress conditions.

At present, many engineers tend to overemphasize safety against cracking. There is undoubtedly in many cases, for example, as has been shown in the tests, little or no benefit to be derived from keeping the concrete in compression at the tensile face. Experience has shown that the tensile bond between concrete and steel is practically independent of the crack width. Therefore, except in cases where leak-proof conditions are required, it is not necessary to limit cracking loads to a minimum even in prestressing and such limitations should be established only after careful study of the individual case. Furthermore, it is questionable whether the arbitrarily chosen safety factor against failure of 2.5 to 5 or more, based on ultimate strength of good concrete, is not unnecessarily high in many cases.

Therefore, we must agree with the Editor's comments in Question 1 of the editorial "Safety Factor for Prestressing" [ENR, April 13, p. 21], with reference to tensile stresses in the concrete.

Indeed, to the present we recommend limiting tensile fiber stress in the concrete to 4 the flexural modulus for live load or to the full flexural modulus for twice live load, depending on which condition governs the design. These stresses can be safely permitted if, at the same time, the wire stresses are kept within limits that exclude the possibility of permanent set under an occasional overload.

A prerequisite for complying with this last requirement is the use of a wire that is suitable for prestressing. Design stress limitations for wire are meaningless if they are not related to specific wire characteristics. If the creep limit, the creep limit and ultimate strength are used for describing the behavior of a type of wire as suggested in your editorial, the recommended design criteria become a function of all three of these characteristics depending upon the loading stage under consideration. The Editor's remarks with reference to Question 2 are therefore particularly appropriate.

In conclusion, we wish to emphasize again the importance of discriminating between safety against cracking and safety against failure. While the first can be fairly well predicted on the basis of stresses in homogeneous section, the second can only be based on the failure load. The relationship of failure loads to wire stress has been the subject of numerous tests, and the behavior at failure of test girders indicates that present methods of ascertaining minimum safety margins against failure are entirely on the safe side.

However, at this early stage of the development, we would consider it unfortunate and premature to attempt to standardize or freeze into a code design procedures that are necessarily subject to revision as American technique is applied and the quality of materials improves. In our opinion, it must continue to be the responsibility of the qualified engineer to determine, on the basis of good judgment, the limitations required in each individual case.

M. Torkarian
Chief Engineer
Packard Enterprises, Inc.
New York, N. Y.

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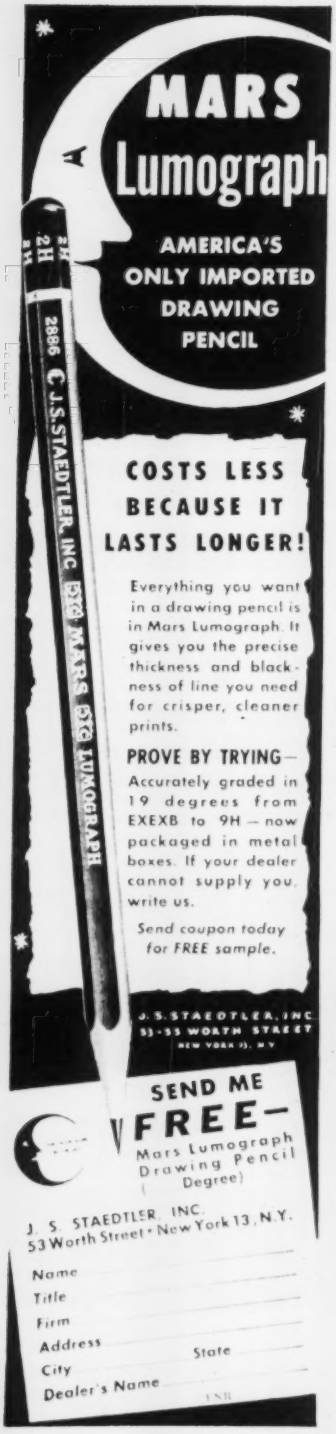
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DEVELOPMENTS ABROAD

New railroad now joins Yucatan and Mexico

After about 16 years of engineering studies and construction, Mexico is scheduled to complete next month a 450-mile railroad to link the Yucatan peninsula with the rest of the republic. Heretofore, transport between the peninsula and the main part of Mexico has been almost entirely by sea.

Yucatan has a number of good-sized cities and its products are well known—among other things, chicle and henequin. However, the area cut off from Mexico proper except by sea has never been a really integral part of the Mexican economy.

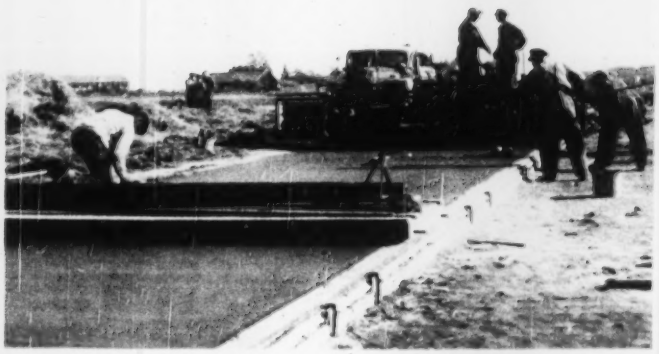
Now a notable engineering feat has been accomplished in the laying of standard gage rails through miles of jungle. They are in an area where work was possible only three months of the year because of excessive rains and the vulnerability of workers to tropical disease in that region.

The new route joins the Mexican rail network at Coatzacoalcos on the Gulf of Mexico about 120 miles south of Vera Cruz. It goes inland and southward to Lerma, near the Guatemala border. There it taps supply to the east and leads across the route which separates the central plateau from Yucatan.

More than 500 bridges had to be built for the railroad. Two of them were 500 ft and 400 ft, respectively. The longer one is over the Mezcalapa River.

The new railroad cost the Mexican government $30,000,000, and it is estimated that 500 workers died from accidents and disease.

Yucatan already has its own extensive rail network, the tracks of which recently have been widened to standard gage in order to accommodate the rolling stock which will move from the Mexico project. The new railroad will make the shipment of raw materials to and from the rest of the country profitable, and it should prove a boon to the tourist business by providing a comparatively easy method of reaching the little-known parts of Mexico.



FOR SWEDISH JET FIGHTERS—Workers are shown doing hand finishing on the paving of a 6,500-ft concrete runway at the private airfield of Svenska Aeroplan AB near Linkoping, Sweden. The concrete strip was necessary for the jet fighters now being turned out in quantity, and the 15-ton load of the company's Scandia transport. The runway is 135 ft wide and 8 in thick, on a bed of gravel and sand, with reinforcing iron at slab joints only. The concrete rammer is of Swedish construction, but American scrapers and tractors are used in the grading. The work is being carried out by AB Skanska Cementgjuteriet, leading Swedish contractor.

Power

Italy—Installation of a 50,000 kw turbo-generator set and related steam generators and accessories in a new plant to be built near Turin for Societa Idroelettrica Piemonte has been approved by the ECA. Local currency requirements for the project, which the company will meet through normal financial channels, are estimated at the equivalent of $4,134,000, plus $325,000 ocean freight, making a total over-all equivalent cost of $10,674,000.

Colombia—It is said that, with its mountainous character and abundant rainfall, Colombia could have hydroelectric works with more than 50,000,000 hp., but at present it has only a fraction of that amount of power. However, five large hydroelectric works now under construction will double the country's present power capacity. Two of these works are enlargements of undertakings already in operation—Empresas Unidas de Energia Electrica, S.A., Bogota, and Empresas Municipales de Energia, Medellin.

The new enterprises are the Central de Anchicaya near Cali, capacity, 70,000 kw; Central del Lebrija near Bucaramanga, capacity, 18,000 kw; and Central de Caldas near Manizales, capacity, 60,000 kw. They are being constructed by incorporated companies with participation by the government.

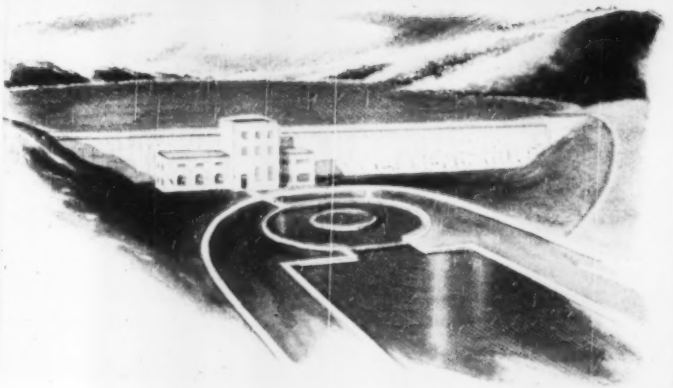
Cyprus—Government of Cyprus has engaged Sir Lindsay Parkinson & Co., Ltd., of London, and the Titan Construction and Engineering Co., of Nicosia, Cyprus, to do the civil engineering and building work for a new power station at Dekhelia, the first part of a project to supply electric power to almost the whole of the island.

Transport

Venezuela—The first part of the Avenida Bolivar in Caracas has been opened. Crossing the city through the middle, it is expected to do much to solve the capital city's serious traffic problem. It will be next year before the entire highway will be completed.

The Caracas-LaGuaira motor road project got under way officially last month and is expected to be completed within a little more than two years, at a cost of $30,000,000.

By the present road, which has 250 curves, it takes about an hour to drive from Caracas to the port of LaGuaira. When the new road is built, the trip will be only 20 minutes long—a saving of 40 minutes.



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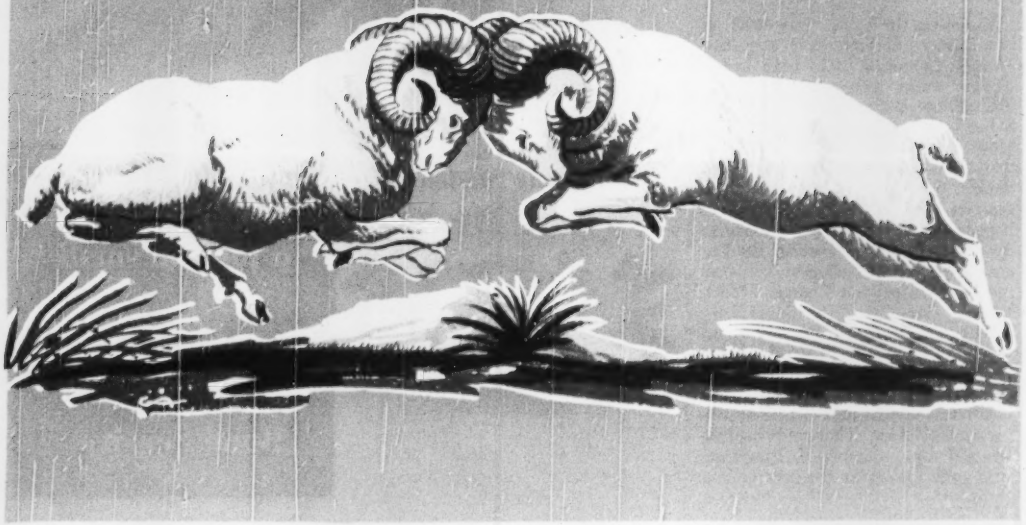

Without shock strength—or, for that matter—without all of the strength factors listed opposite—no pipe laid 100 years ago in *city streets* would be in service today. But, in spite of the evolution of traffic from horse-drawn vehicles to heavy trucks and buses—and today's vast complexity of subway and underground utility services—cast iron gas and water mains, laid over a century ago, are serving in the streets of more than 30 cities in the United States and Canada. Such service records prove that cast iron pipe combines all the strength factors of long life with ample margins of safety. No pipe that is provably deficient in any of these strength factors should ever be laid in city streets. Cast Iron Pipe Research Association. Thos. F. Wolfe, Engineer, 122 So. Michigan Ave., Chicago 3.

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CRUSHING STRENGTH

The ability of cast iron pipe to withstand external loads imposed by heavy fill and unusual traffic loads is proved by the Ring Compression Test. Standard 6-inch cast iron pipe withstands a crushing weight of more than 14,000 lbs. per foot.

BEAM STRENGTH

When cast iron pipe is subjected to beam stress caused by soil settlement, or disturbance of soil by other utilities, or resting on an obstruction, tests prove that standard 6-inch cast iron pipe in 10-foot span sustains a load of 15,000 lbs.

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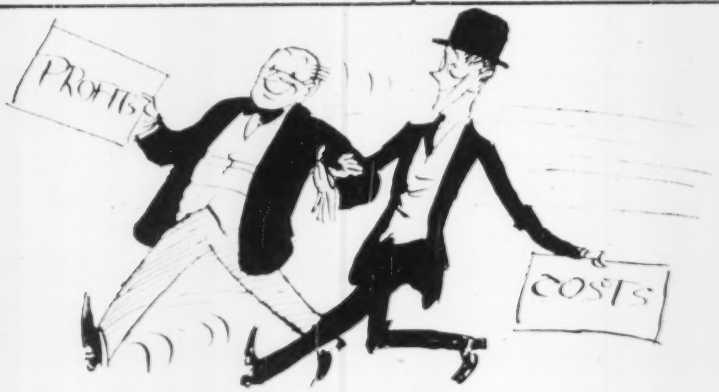

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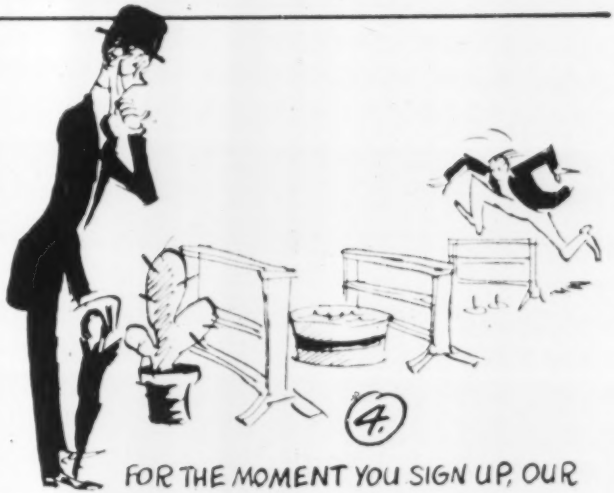

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MUNICIPAL AFFAIRS

Sewage disposal projects and anti-pollution work

Typical of many activities in the sewage treatment and anti-pollution fields are these recent items from five widely-separated communities:

Kansas—All cities and towns in the Kaw River basin which are not providing minimum sewage treatment for city and industrial waste must produce plans for the construction of adequate equipment by Jan. 1, 1952, the Kansas board of Health has ruled.

San Bernardino, Calif.—Plans for nearly seven miles of new trunk sewer lines, a $518,000 intercepting system, have been approved by the city council. R. D. Forsythe, acting city engineer, said the improvement was needed to relieve the load on the present sewer system, which he said was now being used nearly to capacity. The project had been approved previously by the state, which will finance half the construction cost. The other half will be paid from the city's postwar development fund.

Norwich, Conn.—The Connecticut State Water Commission has given Norwich a three-month's extension in which to advertise for bids for construction of a $1,750,000 sewage disposal plant, including a refuse incinerator. It is the second time dates have been extended by the commission for this project, planned for elimination of pollution of the Thames and Shetucket rivers.

Detroit, Mich.—The Michigan Water Resources Commission says that Detroit must build a sewage treatment plant at the outlet of Conners Creek within five years to avoid pollution of the Detroit River.

Vancouver, B. C.—The Vancouver and Districts Joint sewerage and Drainage Board has appointed A. M. Rawn, Los Angeles, Calif., Charles G. Hyde, Berkeley, Calif., and E. A. Cleveland, Vancouver, to review the system of trunk sewers, interceptors and sewage disposal facilities in and around the Burrard Peninsula. One purpose of the consultants' survey is to encourage all municipalities adjacent to the waters of the peninsula from the Pitt River to the Strait of Georgia to plan sewage disposal facilities in advance of growing requirements.

Water Purification—Columbus, Ohio, city council has decided to submit an $8,000,000 general obligation bond issue to voters next November, to finance Hoover Dam on Big Walnut

Creek, and in the meantime, plans to issue $2,000,000 worth of bonds inside the 10-mill limitation to begin work on a Bethel Road project, an integral part of the Big Walnut project. While Hoover Dam and accompanying facilities will not be ready for five years, the Bethel Road plant can be finished within a year.

Erie railroad relocation at Corning, N. Y., to start soon

Work will begin soon in Corning, N. Y., on the Erie Railroad relocation, the most costly single project ever advanced by the New York State Department of Public Works.

The department expects to have the project completed by Dec. 1, 1952. Cost will be more than $10,000,000, including $2,148,934 in work to be performed by the three railroads concerned—the Erie, New York Central and Delaware, Lackawanna and Western.

The railroads will handle track installation, detours, buildings, signals, communication lines, and other construction in the actual railroad operation, and will be reimbursed by the state.

The new work will eliminate all crossings at grade with the D. L. and W. R. R. 6.89 miles of which will be moved to a new improved location on the easterly side of the Chemung River and outside the more densely settled sections of the city.

The tracks and various connections for the new Erie Railroad location at Corning, throughout its entire length of approximately seven miles, will be carried on an earth embankment, the material for which will be obtained from the widening and deepening of the Chemung and Tioga rivers, and from excavation of street depressions.

To carry the embankment over the various streams and streets, a total of 22 bridges will be built, most of which will carry the railroad over local streets. Nine will be multiple span, the longest of which will be about 685 ft.

All tracks except those required to serve local industry will be removed from the streets of Corning. At present, tracks parallel Market Street, the main thoroughfare, and the passing of trains sometimes holds up traffic for a distance as far as ten blocks.

Milwaukee expressways

City officials of Milwaukee, Wis., led by Mayor Zeidler are asking the common council for speedy approval of a $250,000 appropriation to hire consulting engineers for expressway

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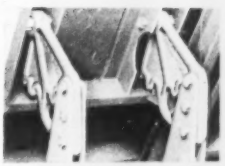

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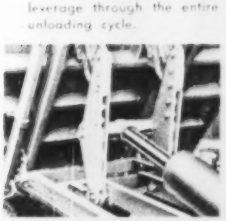

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planning. It is hoped to sign contracts soon for plans for the 44th St. expressway and the first leg of the east-west route. The desire is to start work on the 44th St. artery this summer.

Municipal Briefs

Pure Water for Richmond—A new $2,000,000 James River water purification plant for Richmond, Va., was dedicated recently. Its cost will be paid from revenues and will not affect the water rate or city taxes.

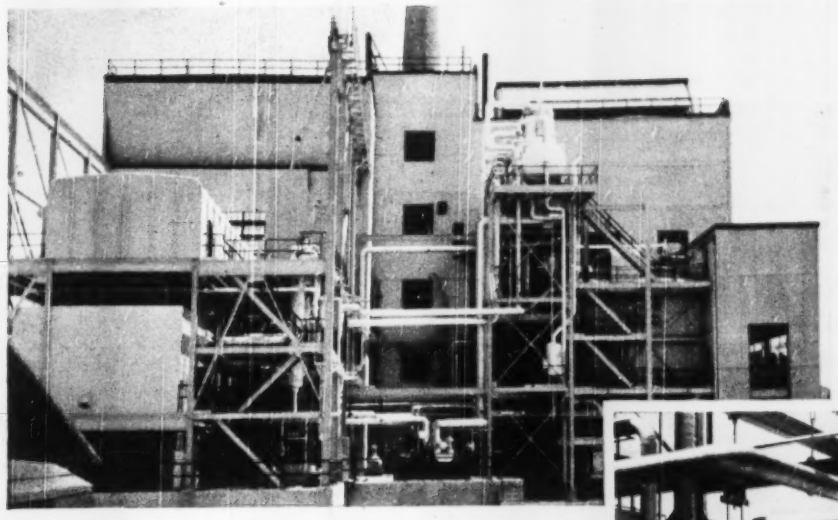
Parking plans—At Jacksonville, Fla., three off-street parking plans are being considered. Mayor Haydon Burns has a plan for eight perimeter parking lots to be operated by a municipal parking authority; a downtown waterfront parking project has been proposed by the city, county and schools improvement committee, and there is also a proposal for an underground parking garage beneath Hemming Park.

To help Buffalo traffic—It is expected the construction of the $8,500,000 high level bridge over the Buffalo River to combine a network of traffic casing arterial highways in Buffalo, N.Y., will be started this spring. It will provide a route for a smooth flow of traffic into and out of the city from the southeast. The State Department of Public Works plans to let contracts for the project in May.

Ft. Lauderdale tunnels OK'd—Commissioners of Broward County, Fla., have approved the entire $15,000,000 proposition offered by the state road department to construct three tunnels in Fort Lauderdale and drawbridges in six communities of the county. The proposal calls for toll revenue bonds of $13,000,000 and a $2,000,000 federal aid grant. Included also would be a 50-year share of county gas tax funds.

City planning commission—The city council of Lebanon, Ind., has approved the establishment of a city planning commission to be composed of three city officials to be appointed by the council and four other citizens to be named by the mayor.

Arterial highway proposed—The Syracuse, N.Y., City Planning Commission has approved a resolution favoring state plans for transforming Oswego Boulevard into an arterial highway, although City Engineer Nelson P. Pitts dissented. The limited access express highway has been estimated to cost between $3,000,000 and $5,000,000 at current prices.



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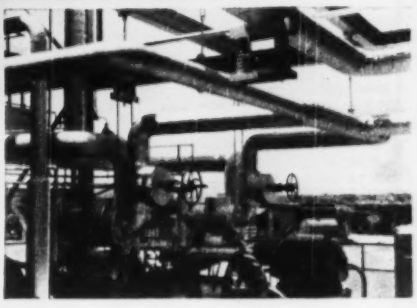

El Paso Electric Company efficiently conserves heat with K&M INSULATIONS

IN 1948, the El Paso Electric Company extended its Rio Grande Power Station to add 20,000 Kilowatts to the existing plant's 46,000 Kilowatt capacity. Boilers, piping, and other heated surfaces were insulated with K&M "Featherweight" 85% Magnesia for temperatures up to 600° F., and with K&M Hy-Temp Combination for temperatures in excess of 600° F.

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MEN AND JOBS

Among recent changes in the Pennsylvania department of highways are the following: **N. A. Staples**, District 8 engineer at Harrisburg becomes assistant chief engineer in charge of maintenance, succeeding **Warren K. Myers**, resigned; **Owen C. Beckley**, assistant chief maintenance engineer; **James L. Hand**, assistant district engineer at Uniontown; **H. L. Worst**, district maintenance engineer at Williamsport; **A. J. Bedard**, district engineer at Harrisburg; **Morris S. Brumbaugh**, maintenance superintendent in Lackawanna County; **Gilbert H. Scigworth**, maintenance superintendent, Tioga County; and **Geo. W. Kline**, acting maintenance superintendent, Somerset County.

Vaughn Downs has been transferred by the Bureau of Reclamation from Coulee Dam to Ephrata, Wash., as chief of the field engineering subdivision of the Columbia Basin Project's irrigation district. He has been construction engineer in the Coulee Dam division of the project. In his new assignment, Downs will be responsible for the location of hundreds of miles of lateral canals and the layout of farm units in connection with the irrigation of thousands of acres in the project, which will begin to get water in 1952.

M. J. Hoffman, Minnesota state highway commissioner, at right, receives the George S. Bartlett Award from Enoch R. Needles, consulting engineer, New York City, recently elected to a second term as president of the American Road Builders Association. The award, made each year by ARBA for "outstanding contribution to highway progress."

Rear Adm. Carl A. Trexel, CEC USN, right, was snapped at the San Francisco AGC convention with his successor and with one of his new bosses. Rear Adm. Lewis N. Moeller, CEC USN, left, succeeded him as director of the Pacific and Alaskan divisions of the Bureau of Yards & Docks on Admiral Trexel's retirement April 1. George Loorz, center, is general manager of Stolte, Inc., Oakland, Calif., contractors, who with Ben C. Gerwick, Inc., San Francisco, Calif., contractors, jointly sponsor International Marine Platform Constructors, of which Admiral Trexel is the new executive manager.

Col. Wm. P. Cornelius has been appointed manager of the new district office at 2121 Commerce Building, Houston, Tex., of Giffels & Vallet, Inc., and L. Rossetti, Associated Engineers and Architects, of Detroit, Mich. Colonel Cornelius had been at Richland, Wash., where he was chief of the construction and maintenance division of the Hanford Atomic Energy project. Giffels & Vallet, Inc. were the engineers on the design of two of the major projects at Hanford Works. They are also engineers for the current Atomic Energy developments at Oak Ridge, Tenn., on which Col. Cornelius was construction officer from 1943 to 1946.

Charles L. Noe, formerly with Jones, Henry & Schoonmaker, Toledo, Ohio, consulting engineers, has been appointed construction supervisor of the Toledo Board of Education's building and modernization program.

John Leslie Rannie, former chairman of the Ottawa Branch of the Engineering Institute of Canada and associated with the Department of Mines and Technical Surveys, has been appointed to be Canadian member of the International Boundary Commission.

Walter H. Cotton, British Columbia public works engineer in the Fernie district for several years, has been transferred to Vancouver. He will retire later this year.

Albert L. Guckert, Columbus, Ohio, director of the Southern Ohio district office of the Federal Housing Administration, who has approved $200,000,000 of insured loans on housing in central and southern Ohio in the last 15 years, will retire next February.

John Alfred Wahl has joined the firm of Kelly & Gruzen, architects-engineers, New York, N. Y., and Jersey City and Newark, N. J., as office and production manager. Mr. Wahl was formerly assistant in charge to Irwin Clavan, architect for the Board of Design of the Metropolitan Life Insurance Co. on the Stuyvesant Town, Peter Cooper and Riverton Housing projects, recently with W. Stuart Thompson and Phelps Barnum, architects.

Col. F. M. Albrecht has relieved Col. J. S. Seybold as district engineer of the Garrison district, Corps of Engineers. He was Fourth Army Engineer at Fort Sam Houston, Tex., prior to assuming his new assignment. A 1923 graduate of the United States Military Academy, Colonel Albrecht was also graduated from Cornell University school of engineering in 1926. He was assistant to the district engineer in the St. Paul district from 1934 to 1938, working mostly on the canalization of the Mississippi River. During the war he was in charge of Army construction in England. On the continent he served as deputy chief engineer of the European Theater of Operations and was on the ETO General Staff.

W. Floyd Fleiderer, formerly Bucyrus, Ohio, service director for six years, and former Crawford County deputy engineer, has been appointed resident engineer of the Ohio Highway Department for the $27,000 North Sandusky Ave. bridge and street widening project in Bucyrus.

Pennsylvania's Department of Health has announced the appointment of **John V. Coyne**, Langhorne, assistant assistant sanitary engineer, and at the same time reported the withdrawal of **Paul W. Weister**, of Philadelphia, from a similar post.

Merle W. Hemphill has become deputy director of the Office of Airports, Civil Aeronautics Authority, under Phillip Moore, director. Prior to joining CAA, Hemphill served four years with the Aviation division of the Navy Bureau of Yards and Docks, and before that was with the bridge division of the Arkansas state highway department. He is a civil engineer graduate of the University of Arkansas, 1935.

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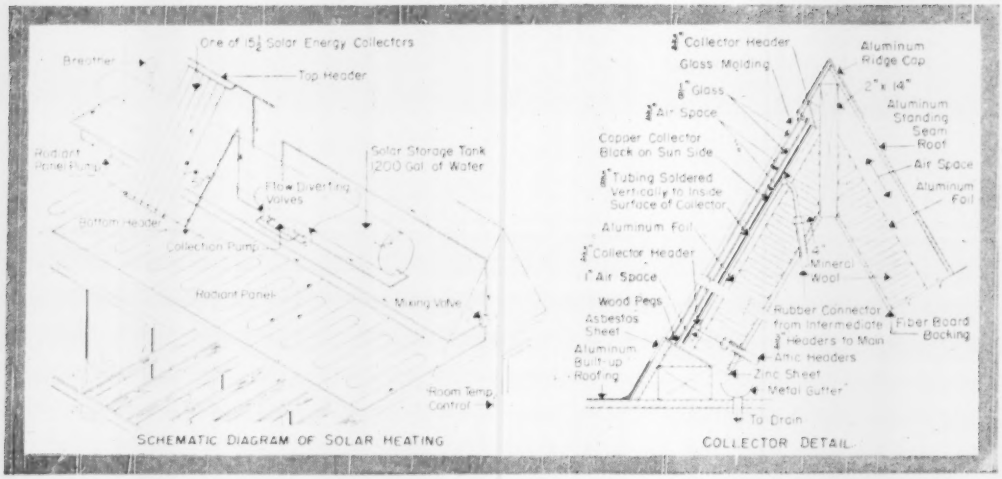

SOLAR HEATING of the MIT house is accomplished with a collector in the roof that warms water for panel heating

Expect full report soon on MIT's sun-heated house

The first complete report on the operation of the Massachusetts Institute of Technology's solar-heated house will be presented this summer to members of a course/symposium on "Space Heating with Solar Energy."

According to the solar energy conversion committee, the full report will restate the prediction that "5 to 10 percent anyhow but claiming house is possible in the Boston area without excessive construction cost."

Tentative figures released show that during the last three months of the 1948-49 heating season, the flat plate collector on the house absorbed 12,350 mil lion B.t.u. of solar energy heat.

In that period, slightly more than half of the total heat requirement was met by the solar energy collector. An additional 50 percent came from sunshine through large double and triple glazed windows in the south wall. After dark those windows were covered by insulating curtains.

A house of this design, according to preliminary calculations, probably could be heated efficiently with solar energy in a climate with an average winter temperature about 10 deg F warmer than Boston's 30 deg. But such a house would still need some auxiliary equipment to carry over long periods of cloudiness and occasional extreme cold snaps.

The "model operated" at this house is that a flat plate collector, sloping 57 deg to the horizontal and facing south, with a net area of 400 sq ft receives the sun's radiation. Water absorbs and carries the heat energy. A tank 36 ft long and of 24 ft dia, incorporated into the system, serves not only as the storage bin of the excess heat of the sun but also as the source of hot water for heating. With this provision of heat storage, excess solar heat energy is held over for use during sunless periods.

Heating of the living quarters is by means of a ceiling radiant panel of ¼-in. copper tubing 9 in. on centers connected between two 1¼-in. headers, all in contact with the plaster. A ½ hp motor driven pump draws water through the radiant panel and returns it to the storage tank.

The thermal control within the dwelling is maintained at 65 deg F by a room thermostat. When necessary, a low-limit temperature level of 65 deg F prevents any continued drop by supplementing the deficiency of solar heat storage with electrical heat energy from the 4 kw electric heaters in the storage tank.

Drop in engineering jobs shown by EJC survey

The general survey committee of the Engineers Joint Council has completed a survey of 1950 employment prospects for engineering graduates. The sources covered by the survey were 311 industrial companies, 45 governmental agencies, and 114 engineering colleges.

According to the survey, the industrial companies employ 16,000 graduate engineers, the governmental agencies 18,200 and the colleges 6,800.

This year the industrial companies are hiring 28 percent fewer engineering graduates than last year; the government agencies 33 percent less, and engineering colleges 34 percent less.

A conclusion from this survey is that with the larger graduating classes this year and the substantial decrease in the demand from organizations represented in the compilation, intensive cultivation of the smaller organizations for openings offers the best chance for placement results.

About 51,000 bachelor's degrees will be given in engineering during 1950. Next year the total will be 50 percent less, and on the basis of freshman and sophomore enrollments, there will be further declines later.

Technology Center—When the Technology Center at the Illinois Institute of Technology, Chicago, is completed, the campus will consist of two parts—east of State Street the faculty office buildings required for the institute itself, and east of State Street a modern housing development sufficient for more than 2,000 staff members and students. This development is made up of apartment buildings, dormitories and the like constructed in a parklike landscape. Architecturally, though of a different design and construction, they blend with the functionally planned Institute buildings.

ELECTIONS AND ACTIVITIES

Shareholders of the Salt River Valley Water Users Association in central Arizona have re-elected Richard D. Searles president and W. W. Pickrell, vice president. Searles won the presidency two years ago in a vigorous campaign. During his tenure he has carried out many of the reforms promised, including development of pump water to augment stored water, extension and improvement of the electrical system, and development of artificial precipitation to increase runoff on the association's watershed.

Harry McCann of Missoula has been elected chairman of the Montana section, American Water Works Association, succeeding M. T. Dixon of Billings. Other officers: M. T. Henderson of Bozeman, vice-chairman; Chet Lee of Billings, elected to the board of trustees, and Arthur Johnson of Kalispell, re-elected a trustee. Hayes W. Ewing of Helena was re-appointed secretary-treasurer, and John W. Hall of East Shaw was named again as state director. Joseph Schmit of Lewistown was nominated for the George Warren Fuller award of the national organization for outstanding service in the water supply field. He is city engineer and water superintendent at Lewistown.

The Montana Sewage Works association has elected Kurt Weil, city engineer at Miles City, as its 1950-51 chairman. Other officers: Rodney Peating of Helena, vice-chairman; R. E. McCormick of Great Falls, trustee, and Sam Ward, Billings superintendent of streets and sewers, re-elected trustee. Earl Fincher of Helena was named Montana director of the Federation of Sewage Works Associations. H. B. Linde of Helena, director of the sanitary engineering division of the state board of health, was re-elected secretary-treasurer. Linde also was nominated for the Bedell award of the Federation of Sewage Works Associations for outstanding service in the field of sanitary engineering.

Ralph Fehrman of Washington, D. C., has been installed president of the Maryland-Delaware Water and Sewage Association. Other officers: E. E. McClung of Washington, D. C., first vice-president; Victor W. Fahy of Wilmington, Del., second vice-president; [illegible] of Wilmington, Del., secretary-treasurer; and Harry E. Jordan of Baltimore, Md., re-elected treasurer. Directors: Fehrman, McClung, Fahy, Jordan, Charles A. Maguire of Baltimore, Md., and Robert Gordon of Wilmington, Del.

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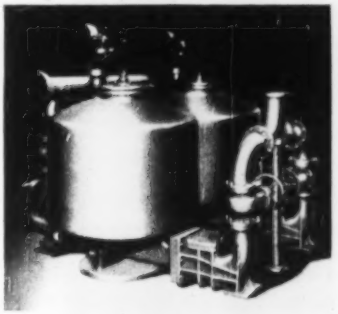

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dent, and W. M. Bagley, Baltimore, secretary-treasurer.

J. J. Gossler, Youngstown, has been elected president of the Ohio Building Material Dealers Association, with Gail B. Hunter, Dayton, vice president, William L. Kern, Jr., Columbus, treasurer, and Claude L. Clark, Columbus, secretary.

Newly elected officers of the Indiana Section of the American Water Works Association are: Chairman, Jack Gordon, of Clyde Williams & Associates, South Bend, Ind.; vice chairman, Charles H. Beebert, Indiana Department of Conservation, Indianapolis; and secretary-treasurer, George G. Lasmacht, Indiana State Board of Health, Indianapolis. The 1950 Fuller Award for meritorious contribution to the water works industry was presented to John Lawrence Ford, at the recent annual meeting of the Indiana Section, AWWA in Indianapolis.

New officers of the American Wood Preservers Association are: President, Fred W. Gottschalk, technical director of the American Lumber & Treating Co.; 1st vice president, W. R. Yeager, inspection engineer, Western Electric Co.; 2nd vice president, R. H. Bescher, manager of technical department, Koppers Co.; and secretary-treasurer, H. L. Dawson.

Vton Skinner, Jr., has been elected president of the Durham, N. C. Engineers Club, succeeding P. D. Davis. Other officers are: M. A. Him, vice-president, and Guy H. Bennett, secretary-treasurer.

MAJOR MEETINGS

Building Officials Conference of America, Indianapolis, Ind., June 4-9.

National Society of Professional Engineers, annual meeting, Hotel Statler, Boston, Mass., June 5-10.

Central States Sewage Works Association, Hotel Lincoln, Indianapolis, Ind., June 9-10.

Western Association of State Highway Officials, Majors Hotel, Reno, Nev., June 12-15.

Pennsylvania Sewage Works School, State College, Pa., June 19-23.

American Congress on Surveying and Mapping, 10th anniversary meeting, Hotel Statler, Washington, D.C., June 21-23.

Pennsylvania Water Works School, State College, Pa., June 26-28.

Ohio Sewage & Industrial Wastes Treatment Conference, Ohio Union, Columbus, Ohio, June 28-30.

American Society of Civil Engineers, annual convention, Hotel Statler, Boston, Mass., June 26-30.

OBITUARY

Maj. Llewellyn Eustace Jones, USA Ret., 65, a consulting engineer and naval architect died May 5 at Philadelphia, Pa.

Norman Foster, 61, a consulting civil engineer and partner in the Sharon Hill, Pa., firm of Damon and Foster, consulting civil engineers died May 8 at Chester, Pa. The firm which serves as engineering consultants for 25 municipalities in the Philadelphia area was formed in 1922.

E. Paul Ford, 65, San Diego, Calif., civil engineer, died May 6. He had served as field engineer at Camp Kearny, supervisor of the enlargement of Ft. Rosecrans, assistant engineer for the Missouri Pacific Railway, general superintendent for the building of Dalworth, Texas, city engineer of the municipality of East San Diego, and resident engineer for the San Diego Securities Co. He was a graduate of the University of Arkansas.

Joshua W. Kelley, 77, who had been in the city engineering department of Springfield, Ill., for 35 years, died there May 7.

Daniel G. Lacey, 67, an authority on municipal highways, died May 7 in Brookline, Mass. He was noted for efficient methods of snow removal and the system he established for that purpose was adopted by many other communities. He entered the Brookline highway department at an early age. He was a past president of the Massachusetts Highway Association.

James Philip McGuire, 49, president of the J. P. McGuire Construction Co., Durham, N. C., general construction and road building firm, died May 13. A native of Syracuse, N. Y., and a graduate of Georgetown University, he entered the contracting business with his uncle, Frank J. McGuire, in Syracuse in 1922 and moved to Durham in 1929. In 1935 he formed the construction firm which bears his name and which is one of the leading building firms in North Carolina.

Stephen A. Power, 74, engineer of the Chicago Bridge & Iron Co. until his retirement in 1945, died in Chicago May 12. He had been employed by the company for 50 years.

H. J. Wernert, 67, Long Beach, Calif., engineer for 25 years connected with the American Bridge Co., died in Long Beach, Calif., May 14. He had

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Electronics	Electricity DC	Highways
Data	AC Motors and	Engineering
Business Data	Generators	Mechanics of
Lumber Data	Transformers	Materials
Air Conditioning	Relays, Meters,	Pocket Trains,
General Math	Hydraulics	Machine
Earth Tables	Surveying	Thermodynamic
Physics	Mech. Drawing	Tables &
Chemical Tables	Machine Design	Charts
Metals	Mechanics Data	Physics & Thermo
Steel Chemistry	Piping Data	Reference Data
Reinf. Concrete	Soil-using Tables	Physics & Org.
Building Costs	Metallurgy	Chemistry

LEFAX, Dept. ER 4 Philadelphia 7, Pa.

been chief engineer of the Canton, Ohio, works of the company for a number of years.

Dean W. Martin, 62, civil engineer and retired Internal Revenue forestry engineer, died in Washington, D. C., May 10. Mr. Martin received an engineering degree from the University of Minnesota. His work for the Government Forest Service began as an evaluation engineer with the timber section of the Income Tax Unit and later he became chief of the Section and in 1935 became chief of the appraisal section of the unit. He retired recently after 30 years service. During World War I, he served overseas with the Tenth Engineers.

Alfred G. Neuffer, 47, Navy Department civil engineer, died May 14 in Fairfax, Va. Mr. Neuffer went to Washington six years ago. Until recently, he was a civil engineer attached to the Naval Air Testing Station at Patuxent River, Md. He attended Lewis Institute in Chicago and served in the Navy during World War I.

Jeremiah A. Sullivan, 51, president of Sullivan Dredging, Inc., New Bedford, Mass., general contractor, died on May 11 in that city. He joined the J. W. Bishop Co., Worcester, Mass., as a young man and later became its president. After 15 years with the Bishop organization he organized Sullivan Dredging in 1936.

John R. Sinclair, 67, former Union Oil Co. civil engineer, died May 4 in Los Angeles. A native of England and a graduate of Oxford, Sinclair came to the U. S. 55 years ago after World War I service with the Canadian Expeditionary Forces.

Earl Friend Stone, 36, resident engineer for the Nevada highway department, died recently at Carlin, Nev., as a result of an automobile accident.

UNIT PRICES BID BY CONTRACTORS

Activated sludge plant in Tuscon, Arizona

Eight bids with the two lowest only $324 apart on a $1,136,280 job were opened Dec. 15, 1949, for the new, 12 MGD activated sludge sewage disposal plant in Tucson, Ariz. The plant is designed for a population of 120,000. Headman, Ferguson, & Cardin, of Phoenix, are consulting engineers. In the final contract, the superintendent's residence was eliminated and the award made to M. M. Sundt Constr. Co., Tucson, at $1,104,294.

The contractor furnishes all labor and materials. He has access to the city by highway and it is only 5 miles from railroad facilities. Work started in late January and must be completed in 365 days. No special problems are involved.

Wages to be paid are: bricklayers, $2.75; carpenters, form workers, cement finishers, $2.50 per hour; sheet metal workers, $3.00; electricians and plumbers, $2.25; common labor, $1.45 minimum to $1.60 average.

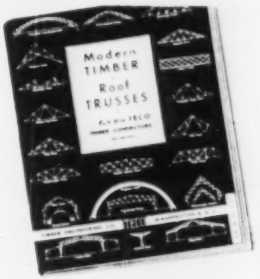
Bidders include:

M. M. Sundt Constr. Co., Tucson $1,104,294.00

2. Vinnell-Gentle Co., Phoenix $1,104,618.00

3. Griffith Co., Los Angeles $1,109,274.00

Items	Quan.	Unit	Unit prices 1	2	3
Excavation	50,000	cy	$0.75	$0.80	$0.80
CI "A" sewer	6,000	lf	2.00	2.00	2.00
CI "A" sewer	200	lf	3.00	3.00	3.00
Bond steel	lbs 200,000		0.12	0.12	0.12
RAS pipe					
Conc. lined CI					
4"	lf	1,000	2.50	2.50	1.90
6"	lf	1,000	2.50	2.50	1.90
Lined CI					
4"	lf	1,000	2.67	2.50	1.90
6"	lf	1,000	2.67	2.50	1.90
8"	lf	1,000	2.90	2.50	1.90
10"	lf	1,000	3.42	3.00	2.00
12"	lf	1,000	3.42	3.00	2.00
CI flanged pipe					
4"	lf	200	3.00	3.00	1.90
6"	lf	200	3.00	3.00	1.90
8"	lf	200	3.00	3.00	1.90
10"	lf	200	3.00	3.00	2.00
12"	lf	200	3.00	3.00	2.00
Fittings					
Conc. lined CI RAS	lbs	5,000	0.28	0.28	0.28
Lined CI RAS	lbs	25,000	0.28	0.28	0.28
Conc. lined CI					
Flanged	lbs	100	0.30	0.30	0.30
Lined CI	lbs	1,000	0.30	0.30	0.30
Reinforced pipe					
8"	lf	200	11.00	12.00	12.00
10"	lf	200	12.00	12.00	12.00
Valves					
4"	ea	200	1.00	1.00	1.00
6"	ea	200	1.00	1.00	1.00
Gate valves					
4"	ea	100	0.25	1.00	1.00
6"	ea	100	0.25	1.00	1.00
8"	ea	100	0.25	1.00	1.00
10"	ea	100	0.25	1.00	1.00
12"	ea	100	0.25	1.00	1.00
14"	ea	100	0.25	1.00	1.00
16"	ea	100	0.25	1.00	1.00
Conc. WI or CI pipe					
6"	lf	500	2.00	2.00	1.90
8"	lf	500	2.00	2.00	1.90
Gate CI flanged fitting	lbs	10,000	0.30	0.30	0.30
Screw end plug valve					
2"	ea	2	12.00	12.00	10.00
3"	ea	2	12.00	12.00	10.00
4"	ea	2	12.00	12.00	10.00
6"	ea	2	12.00	12.00	10.00
8"	ea	2	24.00	24.00	20.00
Flanged plug valve					
4"	ea	2	30.00	30.00	30.00
6"	ea	2	30.00	30.00	30.00
8"	ea	2	40.00	40.00	40.00
10"	ea	2	50.00	50.00	50.00
12"	ea	2	60.00	60.00	60.00
14"	ea	2	70.00	70.00	70.00
16"	ea	2	80.00	80.00	80.00
8" Flanged plug valve	ea	1	40.00	40.00	40.00
10" Flanged plug valve	ea	1	50.00	50.00	50.00
Sluice gates					
24" Drum	ea	1	50.00	50.00	50.00
Sq'd Cast'n mounting					
X-RAS					
6" x 24"	ea	2	1,200	1,200	
12" x 24"	ea	2	1,200	1,200	
18" x 24"	ea	2	1,200	1,200	
Mounting, RAS					
24" x 36"	ea	1	1,200	1,200	
Excavation, fdn. gate					
6" x 24"	ea	2	100.00	100.00	
12" x 24"	ea	2	100.00	100.00	
18" x 24"	ea	2	100.00	100.00	
24" x 36"	ea	1	100.00	100.00	
Backwash Supt. deck					
6" x 24"	ea	1	100.00	100.00	
12" x 24"	ea	1	100.00	100.00	
24" x 36"	ea	1	100.00	100.00	
Primary tank influent gate dr'n'g	ea	1	50.00	50.00	50.00
12" Sluice gate dr'n'g	ea	1	50.00	50.00	50.00
Manual dr'n gates	ea	1	50.00	50.00	50.00
Sed'g tank mech.	ea	1	1,000	1,000	
Thickener mech.	ea	2	1,000	1,000	
Air diff. tank mech.	ea	1	800	800	
Primary sludge pumps	ea	2	1,000	1,000	
Air diff. tank blowers	ea	2	1,000	1,000	
Sec. dig. gas mech.	ea	1	1,000	1,000	
Digest tank dig. mech.	ea	1	1,000	1,000	
Sprinkler nozzles	ea	1	1,000	1,000	
Heat exchangers	ea	1	1,000	1,000	
Pumps					
Centrifugals	ea	1	1,000	1,000	
Sump pumps, control					
Duplex	ea	1	500	500	
Recirc. dig.	ea	1	500	500	
Recirc. dig. Digester	ea	1	500	500	
Centrifugal	ea	1	500	500	
Propeller	ea	1	500	500	
Blow & Aux equip.	ea	1	1,000	1,000	
Oil equip.	ea	1	1,000	1,000	
Sldg. hoist & Access equip.	ea	1	1,000	1,000	
Sldg. hoist & access equip.					
Screens	ea	1	1,000	1,000	
Bldg. fittings	ea	1	1,000	1,000	
Dehydrator & equip.	ea	1	1,000	1,000	
Chlorine Equip't & Installation	ea	1	1,000	1,000	
Instruments	ea	1	1,000	1,000	
Emergency switches, engine & motor	ea	1	1,000	1,000	
Form mat. pl'ng'ng	lf	1	0.50	0.50	
Form mat. subbase	lf	1	0.50	0.50	
Drill & well equip.	ea	1	500	500	
Well	lf	200	6.00	6.00	
Well pump & motor	ea	1	1,000	1,000	
Control bldg.	ea	1	10,000	10,000	
Garage, shop bldg.	ea	1	10,000	10,000	
Sup't's residence	ea	1	10,000	10,000	
Brick bulk'd wall	lf	1	1,000	1,000	
Fencing	lf	1	1,000	1,000	
Elec. work	ea	1	1,000	1,000	
Paved rd. & dr.	sy	1	1,000	1,000	
Landscaping	ea	1	1,000	1,000	
Road & sidewalks	lf	1	1,000	1,000	
3 Link fence & gates	lf	1	1,000	1,000	
Patent Rights	ea	1	1,000	1,000	



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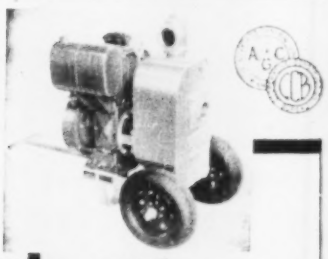

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CONSTRUCTION REPORTS

Bids Asked—Low Bidders—Contracts Awarded

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.
ELSIE EAVES, Manager J. A. MAHONEY, Reports M. R. ROESSLER, Statistics

WATER SUPPLY

BIDS ASKED

Md. Baltimore (P. A. and City Water Dist.) $63

$12,611

Fla. Barton $174,870

$754,726

CONTRACTS AWARDED

Fla. Jacksonville (City, City Hall, Jacksonville) $280,226

Tex. San Antonio $48,000

SEWERS, WASTE DISPOSAL

BIDS ASKED

Md. Towson (P.A. $

+ N. M. Los Alamos (P.A. $

Kan. Hutchinson (P.A. Bids to Accountant, City Hall, Hutchinson, Kan., June 12, Spec. $1 dep., Dec. 1, Spencer & Spencer, Hutchinson, engr.) $

LOW BIDDERS

Fla. Bartow (Sewage Treatment Plant, Bartow) $104,371

La. Lafayette (Sewage Treatment Plant, Lafayette) $421,965

$221,592 $288,582

Wash. Kirkland (Sewage Treatment Plant, Kirkland) $220,279

CONTRACTS AWARDED

Calif. Oakland (Sewage Treatment Plant, Oakland) $737,354

Mass. Boston (Sewage Treatment Plant, Boston) $611,042

N. Y. Port Jervis (Sewage Treatment Plant, Port Jervis) $533,750

Tex. San Antonio (George W. Brown, San Antonio, Nov. 1) $40,000

BRIDGES

BIDS ASKED

Md. Baltimore (P.A. $ City Bureau of Water Supply, Room 9, 1313 E. Fayette St., Baltimore, Md., June 13, $1 dep., Dec. 1, Parsons, Klapp, Brinckerhoff & Douglas, Empire Bldg., Pittsburgh, Pa., engr.) $

New Jersey (P.A. $ New Jersey Turnpike Authority, Newark Int. Turnpike, Zone B, Newark, N. J., June 13, $1 dep., Dec. 1, Parsons, Klapp, Brinckerhoff & Douglas, Empire Bldg., Pittsburgh, Pa., engr.) $

Salem and Gloucester Counties (P.A. $ Freeholders of Salem and Gloucester Counties, Court House, Woodstown, N. J., June 13, $2 dep., Dec. 1, Parsons, Klapp, Brinckerhoff & Douglas, Empire Bldg., Pittsburgh, Pa., engr.) $

LOW BIDDERS

Kentucky $146,927 to Joe Rudd Const. Co., Lexington, Ky.

$114,658

Maryland $137,244

Wis. South Milwaukee (Bridge, South Milwaukee) $99,812

CONTRACTS AWARDED

Washington (Bridge, Spokane) $191,186

STREETS AND ROADS

BIDS ASKED

Delaware (P.A. $ Delaware State Highway Dept., Dover, Del., June 6, $ dep., Dec. 1, Clarence A. Cole, engr.)

Kan. Liberal (P.A. $ Arthur A. Hill & Co., Topeka, Kan., June 16, $ dep., Dec. 1, H. M. Hunter, Liberal, Kan., engr.) $

Calif. Petaluma (P.A. $ City Council, Petaluma, Calif., June 6, $ dep., Dec. 1, Mark Thomas & Co., Inc., San Francisco, Calif., engr.) $

LOW BIDDERS

▲ California $1,392,745

$56,509

Kentucky $146,927 to Joe Rudd Const. Co., Lexington, Ky.

$114,658

Maryland $137,244

$103,150

$122,809

$76,324 $89,489

$75,691 $76,432

$139,472

$105,386

$57,042

$52,913

$72,778

$64,738

$64,365

$88,781

New York $647,612

$150,444 $142,878

Toledo (Safety Bldg., Toledo, May 16, improv. 108, 114 and 115, from N. Bridge Co. to S. Bridge Co., Monroe St., Lucas Co., Ohio, Spec. $2 dep., Dec. 1, Ralph Graham, Safety Director, Toledo, engr.) $59,800 Est. $49,

▲ Pennsylvania (State Hwy. Dist. 11-1, May 24, 11 and variable mi. of bituminous concrete surface on existing concrete base, 2 structures, Contract 27-656, in Beaver Co., on U. S. 219 and 322, T. R. U. S. 219 and 322

PROJECTS COVERED

Projects—By Size

Construction projects here reported cover the United States and Canada (except those of minor size or importance) as follows: waterworks $25,000; other public works $; industrial buildings $68; commercial buildings $; bridges $; streets & roads $; earthwork, subways, etc. $.

Classes of Construction

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Subways, etc.
Tunnels
Grade Crossings
Public Buildings
Commercial Buildings
Industrial Buildings
Miscellaneous

Stages Reported

Bids Asked—Upon receipt of engineer's approval of plans, specifications and estimate of cost. For full explanation of reporting stages see page 3 of issue presenting issues of ENR.

Low Bidders—Reported for jobs estimated at $100,000 value and over. Usually the first reports published of any new work, except where award is not to low bidder. In case a supplementary report will be published.

Contracts Awarded—Except awards to low bidders, usually the first report of work let by the low bidder stage.

Jobs reported in issue on which last previous report was published.

Symbols and Abbreviations Include:

\+ Revised figure.
▲ Project of $1,000,000 or over.
B.A. Bids Asked.
ENR Engineering News-Record.
CD Engineering News-Record Construction Daily.

from ... Bdg. to ... Bdg. ... $1,135,434 ... existing pavement ... $405,704 ... $100,000 ... Center Square, Montgomery Co. ... $397,672 ... $532,544 ... $161,336 ... $359,119

▲ Texas—State Hy. ... $209,449 ... $70,047 ... $116,982 and $101,285 ... $296,512 ... $69,785 ... $85,752 ... $80,456 ... $88,824 ... $75,430 ... $71,647 ... $329,039 ... $188,970 ... $66,650 ... $143,742 ... $94,649 ... $84,444 ... $92,400 ... $145,867 ... $164,698

... $109,824 ... $195,368 ... $74,000

CONTRACTS AWARDED

Minnesota ... $389,739

▲ New York ... $2,069,514

Tex.—San Antonio ... $65,000

Washington ... $348,283 ... $341,424

EARTHWORK, WATERWAYS

BIDS ASKED

Mo.—Kennett ...

† Pennsylvania ...

† New York ...

† New York ...

† California ...

† New York ...

† Washington ...

† Florida ...

LOW BIDDERS

† California ... $684,536

† Illinois ... $510,832

† Illinois ... $348,300

CONTRACTS AWARDED

▲† California ... $1,582,886 ... awarded 5/12 ...

† Indiana ... west of ... St. in New Albany ... $555,406 ...

† Kentucky ... $142,256 ...

Miss.—Greenville ... $46,476 ...

† Ohio ... $266,891 ...

▲† Oregon ... $18,696,031 ...

Tex.—San Antonio ... $40,000

AIRPORTS

BIDS ASKED

† R. I.—Cranston ...

† Fla.—Tampa ...

LOW BIDDERS

▲† Alaska—Fairbanks ... Seattle, Wash. $1,390,500 ... $1,511,930 ...

CONTRACTS AWARDED

▲† Va.—Langley Field ... Newport News ... $2,540,000

PUBLIC BUILDINGS

BIDS ASKED

Fla.—Panama City ...

La.—Monroe ...

† Nebraska ...

▲† N. J.—Trenton ...

N. C.—Durham ...

† Va.—Norfolk ...

Mo.—Webster Groves (St. Louis P. O.) ...

COMMERCIAL BUILDINGS

BIDS ASKED

Tex. Waco—Lyle Adams, ... Bids 4-24

Wis. Milwaukee—APARTMENT—Bids Asked—East Co. ... Zone 7, 4 story ...

500% LETS CONTRACT

La. Marrero—... Zone 2, ...

LOW BIDDERS

Calif. Lynwood—HOSPITAL—Sisters of St. Francis of ... Hospital Unit, Correction—Contract Not Awarded. ...

Ga. Atlanta—... Tenn., Contract Not Awarded. ...

CONTRACTS AWARDED

Calif. Hayward—HOTEL—... $299,200

Calif. Palo Alto—... $670,000

Colo. Pueblo—... Bids 4-24

▲ Del. Wilmington—... $7,000,000

Fla. Fort Lauderdale—... $300,000

Ga. Atlanta—APARTMENTS—... $615,000

▲ Ill. Chicago—... $1,500,000

La. Abbeville—... $250,000

Mo. Jefferson City—... $270,000

Mo. Kansas City—... $610,000

▲ N. J. East Lo...

N. J. New Mil...

▲ ...

One Mt. Angel—CHURCH—St. Benedict Abbey, Mount Angel, Oregon to Ralph & Howatt, 1515 N. First St., Portland, $350,000. Awarded 5-23. Barrett & Lovell, 2440 S.W. 4 St., Portland, Architects.

▲ Pa. Chester—RESIDENCES—Sinclair Builders, Inc., Charles and Nat Sparkman, 1 S. Broad St., Commercial Trust Bldg., residential development, Brookhaven Borough, separate contracts, $6,000,000. Edwards & Green, Broadway and Carmen St., Camden, N. J., Architects. Chester & Baker, Chester Bldg., Engr.

Tex. San Antonio—DWELLINGS—C. C. Browning, Jr., ... Owner Builder, ... $825,000. CD 4-25

Wash. Seattle—STORE, Mercantile Stores, Inc., 6th ... Zone 2, 2 story ... $266,786. CD 5-12

▲ Wis. Milwaukee—HOSPITAL—Columbia Hospital, ... $1,100,000. Bids 5-12. CD 5-15

Wis. Milwaukee—SCHOOL, Immaculate Conception ... $300,000

INDUSTRIAL BUILDINGS

BIDS ASKED

Ill. Sesser—FACTORY—Bids Asked—Crescent Industries, ... Chicago, 1 story, brick ... Chicago engr.

Mass. Chelsea—WAREHOUSE—... Zone 2, 1 story ... $60,000

500% LETS CONTRACT

Ont. Toronto—FACTORY—S. Deyre, archt., ... 1 story ... Zone 4, ... $250,000. CD 4-25

CONTRACTS AWARDED

Calif. Belmont—FACTORY—Williams Wallace Co., ... $61,443. Awarded 5-12. H. B. Welty, ...

Calif. Exeter—PLANT—P. C. Water Taxter, ... $75,000

Conn. West Hartford—WAREHOUSE—Max Lee, ... $75,000

Ill. Palmer—... $267,000

Md. Cheltenham—... $75,000

Mo. St. Louis—... $100,000

Mo. St. Louis—... $125,000

Wash. Seattle—... $100,000

Wis. Milwaukee—...

(Continued on page 70)

"How do you like your 3 LINK-BELT SPEEDER Shovel-Cranes?"

I asked F. E. Young of San Diego,

and this is what he said:

"We keep our three Link-Belt Speeders* busy on a variety of contract projects almost continuously. I like their production records, their downright dependability — the way they take the abuse of a rough schedule. And when necessary, we always get prompt attention from your distributor, Shaw Sales and Service Co.

"Our operators show us that Link-Belt Speeders have lots of power and speed. Our K-360 operator raves about the easy Speed-o-Matic hydraulic controls. He soon learned that the Independent Chain Crowd is a great feature and that no cable breakage reduces down time.

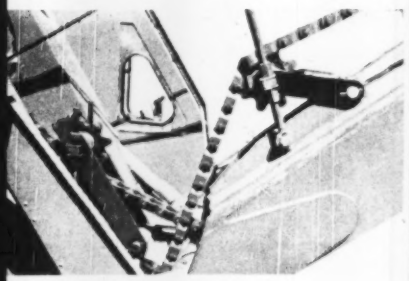
"And our superintendent, R. E. Morriss, just says that anyone of our Link-Belt Speeder Shovel-Cranes is a good rig on any job.

"Do you want more details?" he asked.

"No thanks," I replied. "I have my story."

*A Model K-360, 1½ yd. shovel, with trench hoe and dragline attachments; a Model 75 shovel and trench hoe, a Model HC-70 truck mounted Shovel-Crane.

Editor's note on the Chain Crowd



The positive Independent Chain Crowd mentioned by Mr. Young is an outstanding feature of Link-Belt Speeder Shovels. It is self-adjusting to all boom angles . . . The chain crowd and retract action is controlled by one lever . . . This positive Independent Chain Drive assures fast, accurate positioning of the dipper.

LINK-BELT SPEEDER

LINK-BELT SPEEDER CORPORATION, CEDAR RAPIDS, IOWA

Builders of the Most Complete Line of **SHOVELS-CRANES-DRAGLINES**

11,52.2

(Continued from page 68)

Inc., 5429 W. State St. Zone 8. W. K. Boynton, 611 N. Broadway. Zone 2. engr.

UNCLASSIFIED

BIDS ASKED

† Arkansas ... Southwestern Power Admin., P. O. Box 1619, Tulsa, 3, Okla., 11 mi. 154 kv electric transmission line from Kiamichi to Bull Shoals Dam, Baxter Co., $100,000. Plans deposit $15.

No. Baltimore ... Md., 6 A. 6/2 City Bureau Bldg. Constr., 410 Municipal Bldg. Zone 2, constr. field house, playground and wading pool in Emerson in Auction Sq. Plans deposit $20. J. W. Cain, 410 Municipal Bldg., bldg. constr. engr., CD 1-21-44

† W. Va. ... Point Pleasant ... Navy, Bur. of Yds. & Docks, Wash., D. C. Navy Dept. Bldg., Wash., D. C. Navy Dist. 5th Naval Base, Norfolk 11, Va., automatic sprinkler syst. in Bldgs. 1101 and 1102, at Naval Ammunition Depot, Navy 2-0525. Spec. #4164.

Calif. ... Lakeport ... EXHIBIT BLDG., B. A. 4-13. State Div. Architecture, P. Wks. Bldg., Sacramento, steel frame exhibit bldg. and wood frame exhibit bldg. for exhibit bldg. for 15th District Agricultural Assn. Plans deposit $25. Assn. Boyd Sacramento, state archt.

Calif. ... Monterey ... EXHIBIT BLDG., B. A. 4-13. State Div. Architecture, P. Wks. Bldg., Sacramento, steel frame exhibit bldg. and wood frame administration bldg. with concrete floors for the District Agricultural Assn. Plans deposit $25. Assn. Boyd Sacramento, state archt.

Calif. ... Ventura ... EXHIBIT BLDGS., B. A. 4-13. State Div. Architecture, P. Wks. Bldg., Sacramento, steel frame exhibit bldg. with concrete floors, wood frame exhibit bldg. and wood frame administration bldg. for the 15th District Agricultural Assn. Plans deposit $25. Assn. Boyd Sacramento, state archt.

Calif. ... Woodland ... EXHIBIT BLDG., B. A. 4-13. State Div. Architecture, P. Wks. Bldg., Sacramento, steel frame exhibit bldg. with concrete floors for the 15th District Agricultural Assn. Plans deposit $25. Assn. Boyd Sacramento, state archt.

† N. M. ... Albuquerque ... Box 1548, steel ... Spec. No. [illegible]

† Ga. ... Atlanta ... Ave., S. W., Atlanta, ... Oregon ... WATER DISTRICTS, N. Unit, B. A. 4-13. ... Box 1548, steel ... Spec. No. [illegible]

† West Virginia ... WATER MAIN RELOCATION, B. A. 4-20. ... Madison Ave. and S. W. Huntington, Zone 11, Kentucky & Ohio R.R. Relocation, Sect. 1, Huntington Peninsula Proj., Serial 1 No. CIVIL-16-009, CD 4-13.

LOW BIDDERS

† Fla. ... Green Cove Springs ... SEWAGE DISPOSAL AIR PLANT, ... Ave., [illegible] ... $203,019 (2) ... $176,316

Indiana ... RURAL ELECTRIFICATION LINES, Wabash, Co. ... $112,448

Mass. ... Boston ... Rockland, ... Rochester ... $141,700 ... CD 4-13.

Mo. ... Columbia ... TANK, ... $83,000 ... CD 4-6.

Ohio ... Toledo ... WATER SUPPLY, Distribution, Brush ... Ave., ... $113,000 ... CD 4-6.

Tex. ... Anahuac ... [illegible] ... $215,102 ... CD 4-13.

CONTRACTS AWARDED

N. Y. ... Endicott ... Municipal Golf Course, ... Endicott, ... Fort Pk. ... Assoc., $500,000 ... CD 4-13.

Texas ... AERIAL SPANS ... Transcontinental Gas Pipe Line Corp., Oil and Gas Bldg., Houston, ... Brazos River, near Jones, Wash., and Colorado River, near Eastland, Tex., Bend Co., gasoline between Monument, Tex., area and Eunice, La., and New York, N. Y., to Pittsburgh, Pa. Morris Steel Co., Praetorian Bldg., Dallas, $240,000 ... CD 1-10, under Texas and New York.

Wash. ... Seattle ... Port of Seattle, Pier 36, Seattle, Wash. ... Terminal, Zone 1, Lot 4, on W. 1st piers of Salmon Bay Terminal, with ... & Construction Co., 1932 W. Nickerson St., Seattle, Wash. ... Ave. W., Seattle, $74,500. Bids ... CD 4-13.

▲† Washington ... U. S. Navy, Bur. of Yds. & Docks, Navy Dept., Wash., D. C. Navy Dist. Washington, Naval Gun Factory, Washington, D. C. Navy Yard, Bridgeport, CIVENG 50-51, to ... Bridgeport, Conn., $4,277,100. Bids 4-19. CD 4-24, under Conn.

PROPOSED PROJECTS

WATER SUPPLY

Ala. ... Enterprise ... City, three water improv. projects, No. 1 Proj. 13 ... $46,000. No. 2 Proj. 13 ... $48,600. No. 3 Proj. 13 ... $117,000 ... & Associates, Birmingham, engrs.

Ky. ... Madisonville ... City, ... Inc., Louisville, engr. ... water supply from Green River, ... Madisonville, $500,000. ... Jones & Dowell, 25 Public Ave., engrs. CD 4-18-50.

▲ La. ... Hahnville ... St. ... Parish, WW ... 22 P-1013, water ... S. J. Keller, ... Hahnville, bond election June 6. ... WW ... $1,165,000.

Miss. ... Amory ... City, City Hall, ... 22 P-1015, water ... treatment plant, ... Proj. 22 P-1011, water main ... extn., engr. 22 P-1012, water mains extn., $263,700. ... Allen & Hoshall, 65 N. Cleveland, Memphis, Tenn., engrs.

N. Y. ... Albany ... City, City Hall, ... water ... improv., $540,000.

▲ Okla. ... Oklahoma City ... City, City Hall, voted bonds, WW ... $10,048,000. ... Chase, city engr., CD 4-24.

Tex. ... Abilene ... City, water ... storage, $100,000. ... plant, $150,000; water supply wells, etc., $200,000; ... and mains, $550,000. ... & Associates, engrs. CD 4-24.

▲ Wyo. ... Cheyenne ... City, extn., $1,900,000, north water ... improv., Boise & Veatch, Boise Building, Kansas ...

Wyo. ... Evanston ... City, City Hall, detention ... $200,000; water ... treatment plant, 3 m. pipe line, water ... improvements, ... Tanner & Associates, Boise Bldg., Lincoln, engrs. and mgrs., CD 4-24.

Alaska ... Fairbanks ... City, City Hall, water supply, ... $204,000. ... W. Kottkamp, P. O. Box 485, consult. engr., CD 4-24-50.

N. S. ... Dartmouth ... Municipality, WW extns., $700,000. ... Walter Lahey, Town Hall, engr.

SEWERS, WASTE DISPOSAL

Calif. ... Benicia ... City, City Hall, detention ... $575,000.

▲ Calif. ... Los Angeles ... Los Angeles County Sanitation Dist. No. 19, Lynwood, Maple Ave., ... voted $1,600,000 ... sewer construction. A. M. Rawn, dist. engr.

Fla. ... Orlando ... City, sanitary sewers, Proj. ... $200,000. ... Sykes & Co., engrs., P. O. Box 1448, Jacksonville, engrs.

▲ Ga. ... Savannah ... $1,997,000. ... Warnecke & Associates, P. ... Bldg., Atlanta, and ... & Associates, engrs.

Miss. ... Booneville ... City, sewer improv., Proj. ... $175,000. Leland ... Box 8, engr., CD 4-27-50.

N. J. ... Egg Harbor ... Township, sewage disposal plant, ... $153,000.

O. ... Newton Falls ... Village, sewage disposal plant, $555,000.

Tex. ... Abilene ... City, ... $450,000; sewage treatment plant, $200,000; ... $386,000. Kleinecke & ... engrs.

▲ Ont. ... Kingston ... Public ... Ont., A. E. ... sewers, Agnes ... $1,000,000. ... Fleming, ...

BRIDGES

Connecticut ... State of, A. Bert Hill, chief, Hartford.

Bolton ... [illegible]

... existing traffic circle, Willimantic and Coventry Rds., $575,000. Roy Jorgenson, dir. engr.

South Dakota ... State Hy. Comm., Pierre.

Hamlin Co. ... Bridge at Big Sioux River, State Hy. 28, ... $70,000.

Lyman Co. ... Bridge at White River, U.S. Hy. 183, ... $150,000. C. W. Lawler, city water, state engr.

Tenn. ... Chattanooga ... Hamilton Co., Hy. Dept., ... $50,002; ... No. 2, ... $58,000; Proj. No. 40 P-1002, $50,000; Proj. No. 40 P-1003, $100,000; Proj. No. 40 P-1004, $50,000; Proj. No. 40 P-1010, $60,000; Proj. No. 40 P-1011, $50,000; Proj. No. 40 P-1012, $50,000. L. A. Jennings, state ... engr.

▲ Tex. ... Brownsville ... Cameron Co., Brownsville, Cause ... as of ... and ... Padre Island, near here, $2,500,000. A. Tamm, Harlingen, consult. engr., CD 4-27-50.

Wash. ... Spokane ... Spokane Co., Courthouse, 503 N. ... concrete ... bridge across Spokane River 2 mi. east of ... $200,000. ... engr.

Que. ... Quebec City ... Municipality, grade ... eliminate ... at ... and St. Walter St., $100,000. Ed. Hamel, City Hall, city engr., CD 10-1-43.

STREETS AND ROADS

Fla. ... De Funiak Springs ... City, street improv., Proj. No. 1, P-1-2, $125,000. P. T. Kenan & Assocs., 272 ... Bldg., Jacksonville, consult. engrs.

N. C. ... Sanford ... Town, bond election June 20, surfacing ... $100,000.

▲ Okla. ... Oklahoma City ... City, City Hall, voted bonds, ... avgs., $6,500,000. H. J. Chase, city engr., CD 4-24.

Washington ... State Hy. Dept., Olympia.

Alaska ... Co., ... to ... Bridge in Juneau, $150,000.

... Bridge at Ruth, Grant, Bonnie, Rivers to ... state line, $55,000.

... Bridge at Ruth, Grant, Bonnie, Rivers to ... state line, $55,000.

... result of ... between Anchorage and Fairbanks, ... Assn., $190,000. W. A. Bugge, state hy. dir.

Washington ... Co., ... Three Forks Hy. for 3 mi., north ... Spokane Co., $70,000.

Walla Walla Co. ... Walla Walla, S. 9th St. between city limits ... and Russell, $100,000. ... surf. 3 mi., Walla Walla to ... Forks, $315,000. ... Duke to Wallula, revisions, $40,000. ... Duke to Wallula, revisions, $40,000.

Whitman Co. ... Pullman, Three Forks Hy., in Colfax, $66,000. A. Bugge, state hy. dir.

Wash. ... Colfax ... Whitman Co., Courthouse, grading, surf., ... Endicott, Winona Rd., $95,000. 4 mi. ... Albion-Kitzmiller, $75,000. J. W. Arrasmith, co. engr., CD 8-17-45.

Wyo. ... Rawlins ... City, City Hall, plans by James T. ... & Assocs., Converse Bldg., Laramie, sidewalks, ... storm ... and ... on ... of City ... Hwy., north of Cedar, ... east of First ... $228,500.

EARTHWORK, WATERWAYS

▲ Okla. ... Oklahoma City ... City, City Hall, voted bonds, ... $2,775,000.

† South Carolina ... U. S. Eng., Charleston, S. C. ... Hy. ... Georgetown Harbor, Georgetown Co., $440,000.

AIRPORTS

Okla. ... Oklahoma City ... AIRPORT, City, City Hall, voted ... $600,000. ... engr., CD 4-10.

† Tex. ... Corpus Christi ... AIRFIELD PAVING, U. S. Dept. ... Navy, ... Officer in Charge of Construction, ... Bldg., New York, N. Y., ... Navy, ... $250,000.

Que. ... Dorval ... $2,000,000. ... $200,000. ... Transport, Ottawa, Dist. engr.

LATIN AMERICA

Chile ... Valparaiso ... Municipality, [illegible] ... $200,000.

Haiti ... Port-au-Prince ... Dept. of Work, Port-au-Prince, ... $4,000,000. ... Municipality of Port-au-Prince, engr.

Mexico ... Guadalajara ... Municipality, ... $1,000,000. ... City, engr.

Panama ... El Cano ... $1,000,000. ... Panama City, engr.

Philippines ... Manila ... Enterprises, Inc., Manila, ... $500,000.

Venezuela ... Cerro Bolivar ... Mining Co., Caracas, ...

Venezuela ... Cerro Bolivar ... Mining Co., Caracas, ...

PUBLIC BUILDINGS

▲ Ark. Little Rock

Calif. Fresno

Calif. Riverside

▲ Calif. Vallejo

▲ Fla. Tampa

▲ Ga. Atlanta

▲ Ga. Columbus

Ga. Cornelia

Ga. Dalton

▲ Ga. East Point

▲ Ga. La Grange

Ga. Lawrenceville

▲ Ga. Thomasville

▲ Idaho Boise

▲ N. J. Bordentown

N. J. Clinton

▲ N. J. Greystone Park

N. J. Marlboro

N. J. New Lisbon

N. J. Rahway

▲ N. J. Trenton

N. J. Tuckerton

▲ N. Y. Brooklyn

Okla. Oklahoma City

▲ Tex. Dallas

Tex. Fort Worth

▲ Tex. Pasadena

Tex. Victoria

Tex. Waco

N. S. Dartmouth

COMMERCIAL BUILDINGS

Ga. Atlanta

Ga. Augusta

Idaho Boise

Idaho Idaho Falls

▲ Ind. Indianapolis

Ky. Glasgow

Ky. Gilbogle

Md. Baltimore

Mass. Dracut

Mont. Billings

N. Y. New York

▲ N. Y. Rochester

▲ Tex. Fort Worth

▲ Tex. Fort Worth

Tex. Houston

Tex. Houston

Tex. Houston

Tex. Pasadena

▲ Tex. Pasadena

Tex. Pasadena

Tex. San Antonio

Tex. Texas City

▲ Tex. Waco

Va. Williamsburg

Wash. Seattle

▲ Wash. Wenatchee

Wash. Yakima

Wis. Milwaukee

Alta. Edmonton

▲ Alta. Edmonton

N. Sc. Halifax

Ont. Toronto

Ont. Toronto

Que. Hemmingford

Que. Outremont

Que. St. Eustache

INDUSTRIAL BUILDINGS

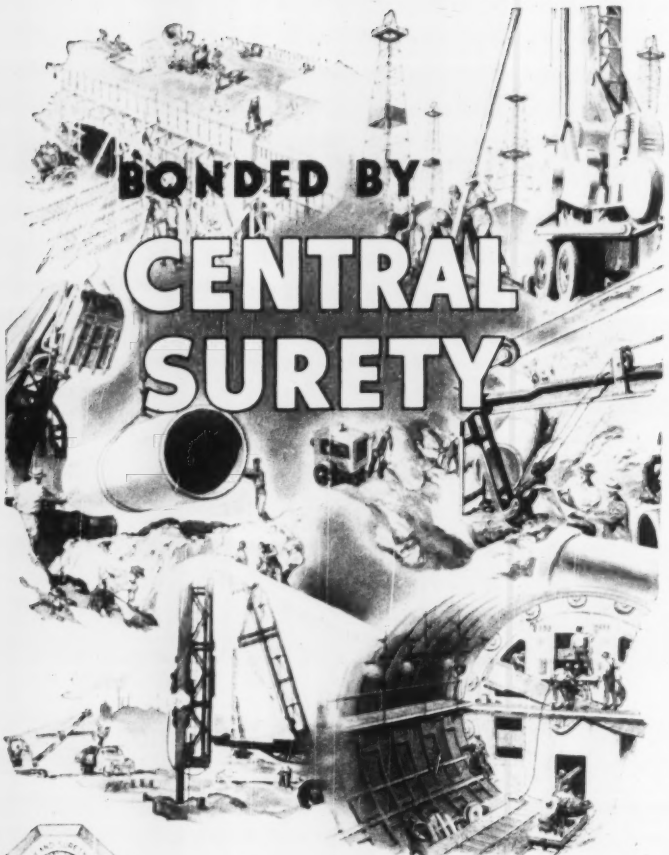
Ga. Atlanta

Ky. Horse Cave

▲ N. Y. New York

▲ N. C. Asheville

▲ Calif. Azusa



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Scranton, Pa. Dept. E, U. S. A.

Ont., Cty. Nueces Co. Navigation Dist., Corpus Christi, consult. engr.

Tex., Houston—PLANT—W. D. Haden Co., 1720 Delano St., sand, gravel, ready-mixed concrete plant, 10.5-acre tract purchased at Griggs Rd. Long Dr., $250,000.

Tex., Houston—INDUSTRIAL—Texas Construction Materials Co., 2405 Milam St., 2-story, masonry industrial, Pierce and Travis Sts., $100,000.

Wis., Chilton—FACTORY—American Specialty Co., 10 and Wellner Sts., Manitowoc, factory addn., $150,000, equip.

Alta., Edmonton—WAREHOUSE—John Deere Plow Co., Edmonton, industrial warehouse on 5-ac. site, $400,000.

B. C., Squilmacheen (Kootenay East)—MILL—Silver Lead Mines Ltd., 439 W. Pender St., Vancouver, B. C., mill, $165,000.

Newfoundland, Burin—PLANT—Fishery Products Ltd., plant, frozen fish and fish meal processing plants, approx. $110,000.

Newfoundland, St. John's—PLANT—Lake, Whalley & Co., St. John's processing plant, approx. $350,000.

▲ Ont., Chatham—FACTORY—American Can Co., 1 story, 55 x 120-ft. addn. to steel frame, concrete factory, approx. $1,500,000. Gut, Ness & Fraser, Ltd., Canada Trust Bldg., Windsor, engrs. CD 5-28.

▲ Ont., Cornwall—PLANT—Howard Smith Paper Mills, Manitoba Pulpwood, pulp processing plant, approx. $1,000,000. W. H. Arbuthnot and Sawers, 1235 McGill College Ave., Montreal, Que., engrs. CD 5-1.

Ont., London—PLANT—Fraser Dairy Co. (London) Ltd., milk processing plant, Fraser & Beatty, engrs., Toronto, approx. $100,000.

Ont., Owen Sound—FACTORY—Brown Kennedy, Ltd., manufacturing brick, tile and clay products, $500,000.

UNCLASSIFIED

▲ Arkansas, Ark. River—[illegible] Army, Corps of Engrs., Little Rock, Ark., plans for [illegible] Arkansas and Verdigris Rivers, Arkansas and Oklahoma, $12,000,000-$14,000,000.

California, [illegible]—[illegible] Co., [illegible] Ave., [illegible], [illegible] Calif., [illegible] Co., [illegible] Calif., [illegible] Co., [illegible] Calif., [illegible] Co.,

CONSTRUCTION REPORTS-Second Section

WATER SUPPLY

SEWERS, WASTE DISPOSAL

BRIDGES

STREETS AND ROADS

Nebraska—State Dpt. Roads & Irrigation, Lincoln, May 17 (postponed from May 10). Grading & surfacing 2.4 mi. Hyannis-Antioch Rd., Grant County. Low bid by Mid-West Const. Co., Alliance, $100,913.

▲ Texas—State Hy. Comm., Austin, May 17. Flexible base, one course and two course surf. tr. C. Cage, Hall, Travis, Bosque, Johnson, Navarro, Ellis and Dallas Counties: 13.96 mi. Hy. FM 1497 and 1498, V 488 S-1 and V 1320-1-1, $222,523; est. $187,000. Flexible base, one course surf. tr. C. Cage, Hall, Travis, Bosque, Johnson, Navarro, Ellis and Dallas Counties: 13.96 mi. Hy. FM 1497 and 1498, V 488 S-1 and V 1320-1-1, $222,523; est. $187,000. Asphaltic concrete surf. tr. C. Cage, Hall, Travis, Bosque, Johnson, Navarro, Ellis and Dallas Counties: 13.96 mi. Hy. FM 1497 and 1498, V 488 S-1 and V 1320-1-1, $222,523; est. $187,000. Asphaltic concrete surf. tr. C. Cage, Hall, Travis, Bosque, Johnson, Navarro, Ellis and Dallas Counties: $81,703; est. $77,000. Flexible base, one course surf. tr. C. Cage, Hall, Travis, Bosque, Johnson, Navarro, Ellis and Dallas Counties: $81,703; est. $77

▲† California

† California

† Montana

CONTRACTS AWARDED

† California

$609,927

SOON LETS CONTRACT

▲† New York

$1,350,261

AIRPORTS

BIDS ASKED

Conn. Windsor Locks

† Mass. Falmouth

$265,100

† D. C.

† Ky.

† Va.

† R. I.

† Mass.

CONTRACTS AWARDED

† Calif.

▲ Pa.

LATIN AMERICA

Brazil

PUBLIC BUILDINGS

BIDS ASKED

† Ark.

▲ N. Y.

N. Y. Valley Stream

† Pa.

S. C. Orangeburg

▲ Ark.

† La.

† La.

† S. C.

Ky.

† Tex.

▲

† Wash.

Wis. Madison

† Wyoming

Ore.

Ariz.

Calif.

La.

Ore.

S. C. Columbia

† Va.

† Wis.

† N. M.

Ark.

† Tex.

† Wash.

† N. Y.

▲ N. Y.

▲ Wash.

Ore.

LOW BIDDERS

† Ark.

$826,820.

Calif., Berkeley

$649,377.

Calif., Merced

$879,600.

Calif., Santa Rosa

$566,500.

Ill., DeKalb

$668,500.

Ill., Freeport

$472,000.

Kan., Kansas City

$414,000.

▲ Ky., Lakeland

$1,129,000.

Ky., Oakland

$423,500.

▲ Mich., Detroit

$5,520,000.

▲ N. Y., Cortland

$1,262,000.

▲ N. Y., Dannemora

$1,587,000.

N. C., Raleigh

$823,400.

N. C., Wilson

$743,950.

▲ Pa., Monessen

$1,074,400.

▲ Pa., Phila.

$1,683,894.

Tex., Fulton

$324,600.

Tex., Wichita Falls

$510,242.

W. Va., Matewan

$611,000.

Ont., Alliston

CONTRACTS AWARDED

Calif., Los Angeles

$335,294.

Calif., Merced

$879,600.

▲ Conn., Danbury

$1,091,630.

▲ Conn., Greenwich

$1,260,000.

Ky., Hopkinsville

$837,000.

Ky., Hopkinsville

$837,000.

Ky., Oakland

$423,500.

Mich., Coldwater

$744,101.

Mo., Mexico

$527,300.

† New Jersey

$563,249.

† N. J., East Orange

$712,170.

N. J., Newark

$921,000.

N. Y., Massena

$607,263.

▲ Tex., Plainview

$1,064,605.

Tex., Port Arthur

$550,230.

North West Territories, Fort Resolution

$500,000.

Ont., Port Arthur

$994,500.

COMMERCIAL BUILDINGS

BIDS ASKED

▲ Conn., Stamford

N. C., Cullowhee

▲ Que., Lachine

▲ W. Va., Raleigh

▲ N. M., Albuquerque

Tex., Corpus Christi

$275,000.

Tex., Pharr

SOON LETS CONTRACT

N. H., Newport — HOSPITAL—Carroll F. Wright Hospital, Elm St., Newport, soon lets contract 40x184 ft., 2 story & basement maternity unit, operating room, nursery, laboratory. $400,000. Plans by owner. Clark & Arvidson, 63 State St., Boston, Mass., engr. CD 8-4.

LOW BIDDERS

Ala., Montgomery — APARTMENT—Montgomery Towers, Perry St., Smith & Adams, archts., 301 Commerce Ave., apartment, Bear Brook, 25 E. Jefferson St. Approx. $750,000.

CONTRACTS AWARDED

Calif., Los Angeles — DWELLINGS—Rowland Gardens, 4302 Wilshire Blvd., 76 dwellings. $816,720.

Calif., Los Angeles — DWELLINGS—Terrace Manor, Inc., 4427 Wilshire Blvd., 52 dwellings, Saturn Ave., Venice Blvd., Zone 12, John Graham, archt. $674,000.

Conn., Glastonbury — HOUSING—Arthur G. Woods, 1090 Main St., Hartford, 65 frame houses, Owner builder. $650,000.

Conn., Manchester — HOUSING—Alexander Jarvis, Dover Rd., 50 houses. $800,000.

D. C., Wash. — DWELLINGS—Howard Homes, Inc., 1701 Eye St., N.W., one story, brick, cinder block, 42 dwellings, Kansas Ave., N.W. $440,000. Lewis-Dent Ave., N.W.

Fla., Bal Harbour Village — Fontainebleau Corp., 1 story, Miami. Approx. $800,000. CD 4-18.

Fla., Opa Locka — HOTEL—Curtiss Park Hotel Corp., Zenith Building, Inc., 1202 S.W. 1st St., Miami. Approx. $800,000.

▲ Ill., Chicago — APARTMENT—Lake Terrace Apartments, Marine Dr. and Lake Terrace Zone 6a, 25 story, 214 units, 172 W. Washington St., Zone 1. $1,353,000. Awarded

▲ Ill., Chicago — APARTMENT—Normal Terrace Apartments, 1214 N. LaSalle St., Zone 3. $1,750,000. Awarded

Ind., Richmond — HALL OF SCIENCE—Earlham College, Zone 11. $736,000.

Ky., Louisville — APARTMENT—Kent & Barrett, Limited, 211 S. 4th St., 2 story, brick, cinder block, 24 units, Zone 2. $500,000.

La., New Orleans — APARTMENT—Zone 2. $500,000.

La., New Orleans — $544,500.

La., Shreveport — APARTMENT—Zone 4. $700,000.

▲ Md., Bladensburg Park — $1,200,000.

▲ Minn., Minneapolis — $2,000,000.

▲ Minn., St. Paul — APARTMENT—$1,000,000.

▲ Mo., St. Louis — $1,200,000.

Mo., University City (St. Louis) — APARTMENT—$800,000.

Neb., Lincoln — $800,000.

▲ N. J., Camden — APARTMENT—DEVELOPMENT—

INDUSTRIAL BUILDINGS

BIDS ASKED

UNCLASSIFIED

BIDS ASKED

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U. S. Government

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, Sealed bids (Specification No. 20674) will be received by Bureau of Reclamation, Tracy, California, June 21, 1950, and then publicly opened for furnishing labor and materials and performing all work for the construction of earthwork and structures, Station 4+12 to Station 627+24, San Luis Wasteway and Inside Drainage, Delta-Mendota Canal, Central Valley Project, California. The work is situated near Volta, California. Principal items are approximately: 3,300,000 cu. yds., excavation, 190,000 cu. yds., construction of reservoir dikes; 8,400 cu. yds., concrete; 57,000 lbs., structural steel; gates, and metalwork and other work. The work is divided into 2 schedules. Time allowed for completion will be 625 days. For particulars, address Bureau of Reclamation, Tracy, California, or Building 1-A, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner.

(7851)

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation, Sealed bids (Specification No. 20561) will be received by Bureau of Reclamation, Friant, California, June 29, 1950, and then publicly opened for furnishing labor and materials and performing all work for the construction of earthwork, concrete lining, and structures, Station 604+00 to Station 820+29.0, Friant-Kern Canal, Central Valley Project, California. The work is situated from about 22 mile southwest to about 4 miles west of Bakersfield, California. Principal items are approximately: 2,894,200 cu. yds., excavation for canal; 84,340 cu. yds., unreinforced concrete canal lining; 4,168 cu. yds. concrete instructures; 145,-100 lbs., furnishing and handling cement; 1,274,000 lbs., furnishing and placing reinforcement bars. Time allowed for completion will be 700 days. For particulars, address Bureau of Reclamation, Friant, California, or Building 1-A, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner.

(7857)

MISSOURI RIVER BASIN PROJECT, Design Section, Casper, Wyoming, May 15, 1950. Specifications VH-125. NOTICE IS HEREBY GIVEN that sealed bids on Specifications No. VH-125 will be received at P. O. Box 2401, Casper, Natrona County, Wyoming, until 10 a.m., Mountain Standard Time, June 6, 1950 and then publicly opened for furnishing prefabricated building for Garage and Machine Shop at Recreation Center near Casper, Wyoming, Missouri River Basin Project, Wyoming. Copies of specifications may be obtained or the specifications may be obtained from the following offices of the Bureau of Reclamation: A. A. Batson, Regional Director, New Customhouse, Denver, Colorado; and L. J. Matthew, District Manager, P.O. Box 280, Casper, Wyoming. No charge to prospective bidders for copies of the specifications, to other persons, per copy, not returnable.

(7852)

OFFICIAL PROPOSALS

Bids: June 12, 1950 (7853)

Water Supply

Sealed proposals for the Construction of a Water Supply for the Village of Newark, New York will be received by the Village Board of the Village of Newark at their office in the Village Hall, Newark, New York at 8 o'clock P.M. EDT on the 12th day of July, 1950.

Information for bidders can be obtained at the office of the Village Clerk at the Village Hall, Newark, New York; or the office of William S. Lozier Company, Engineers, 19 Gibbs Street, Rochester, New York. Copies of plans may be obtained upon the payment of twenty-five dollars ($25.00) for each set, which will not be refunded.

The work consists of the construction of an intake structure and subaqueous pipe line in Canandaigua Lake; approximately 21 miles of 24", 20" and 16" Water main and appurtenances between Canandaigua Lake and the existing reservoir near Newark; a slow sand filtration plant; a control and chlorination house; valve vaults at the reservoir; connections to existing facilities and the separate furnishing of pipe materials for portions of above work.

J. A. Dear
Village Clerk
Newark, New York

Dated: June 1, 1950

Bids: June 15, 1950 (7854)

Additions to Disposal Plant

Sealed proposals for furnishing equipment and certain other materials to be used in the construction of the Additions to Allens Creek Disposal Plant of Brighton Sewer District No. 2 will be received by the Board of Sewer Commissioners at their office, 50 Gibbs Street, Rochester, N. Y. until 2:30 o'clock, P.M., EDT, on the 15th day of June, 1950.

Information for bidders can be obtained at the office of William S. Lozier Company, Engineers, 19 Gibbs Street, Rochester, N. Y.

BOARD OF SEWER COMMISSIONERS
BRIGHTON SEWER DISTRICT NO. 2
By Thomas Allchurch
Harold V. Madigan
G. Alfred Sproat

May 17, 1950

Bids: July 14, 1950 (7770)

Sewage Treatment Plant

BETHLEHEM, PA.
NOTICE TO BIDDERS
GENERAL CONSTRUCTION
Contract No. 1

Sealed proposals addressed to the Bethlehem Authority of the City of Bethlehem, Pa. for General Construction of a Sewage Treatment Plant, will be received at the office of the Bethlehem Authority, 28 N. New St., Bethlehem, Pa. until 9:00 A.M. Eastern Standard Time on the 14th day of July 1950 at which time and place they will be publicly opened and read.

Plans and specifications, form of contract and bidding blanks are on file and may be examined at the office of the Bethlehem Authority, 28 N. New St., Bethlehem, Pa. Prior to making up a bid by a prospective bidder an amount will be required of a bid submitted and the plans are returned in good condition. In case no bid is submitted $15.00 will be refunded if said plans and specifications are returned in good condition within two weeks of the date for the opening of bids by the Authority.

No bidder will be permitted to withdraw his bid for a period of thirty (30) days after the date set for the opening of the bids.

The Bethlehem Authority reserves the right to waive any informality in any bid or bids received and to accept or reject any or all proposals or parts of proposals as the Authority may deem advisable to the best interests of the City of Bethlehem, Pennsylvania.

Each proposal shall be accompanied by a certified Check, Bank Treasurer's Check, or Cash Bond in the amount of five (5) per cent of the total of the bid, payable to the order of the Bethlehem Authority, Bethlehem, Pennsylvania. The bidder to whom a contract is awarded will be required to furnish, for the faithful performance of the work under the contract, an approved Surety Company performance bond in an amount equal to 50 per cent of the total of the bid as specified and a separate Surety Company Labor and Materialmen's Bond in an amount equal to 50 per cent of the total of the bid submitted.

Bethlehem Authority
Bethlehem, Pennsylvania
By: W. R. Coyle, Chairman
Robert L. Fox
Executive Director

Bids: May 17, 1950 (7809)

Greenville-Lake Village Bridge Over the Mississippi River

CITY OF GREENVILLE, MISSISSIPPI

1. Sealed bids for altering the roadway floor and making certain additions to a portion of the above named bridge, to provide for the installation by others of 4-20 in. gas pipe lines, will be received by the City Council of Greenville, Mississippi, at the office of the municipal clerk in the City Hall, Greenville, Mississippi, until 10:00 A.M., C.S.T., June 9, 1950, and then will be publicly opened and read.

2. The work for which bids are requested includes removal of the present reinforced concrete roadway slab on a portion of the bridge and its replacement with a lighter weight steel armored floor; modification of supporting metalwork and of ties, and removal of structural supports for pipelines now on the bridge and installation of new structural supports for pipe lines. Pipelines now on the bridge will be removed and the new pipelines and their appurtenances will be installed by others.

3. Each bid shall be accompanied by an acceptable bid bond or certified check in an amount not less than five per cent of the total amount of the proposal. Bids and bid bonds may be held for a period of not more than thirty days after the date of opening thereafter bid bonds will be returned to bidders not awarded contracts.

4. All work except painting is to be completed in not more than 150 calendar days, and painting in not more than 30 calendar days thereafter. Bonus payments for early completion of the work will be made. Delayed completion shall be compensated by assessment of liquidated damages. Performance bond will be required.

5. Copies of plans and specifications are on file and may be examined at the office of the city clerk, city hall, Greenville, Mississippi, and at the office of the engineer, Howard, Needles, Tammen & Bergendoff, consulting engineers, 921 Walnut Street, Kansas City, Missouri. Prospective bidders will be supplied two sets of plans and two copies of the specifications upon depositing $50.00 with the engineer, of which $25.00 will be refunded upon return of the documents. Tracings of the plans will be placed with a commercial blueprinting company from whom any prospective bidder who has made the deposit above stipulated may purchase as many additional blue print copies of any or all sheets as he may desire at the cost of same. Prospective bidders may secure extra copies of the specifications from the engineer for $5.00 per copy.

6. The City Council of Greenville reserves the right to reject any or all bids and to make award without technicalities as to procedure.

CITY OF GREENVILLE
Mississippi
W. B. Williamson
City Clerk

(Continued on page 78)

READ THE OFFICIAL PROPOSAL COLUMNS OF ENGINEERING NEWS-RECORD THIS WEEK AND EVERY WEEK

OFFICIAL PROPOSALS

(Continued from page 78)

Bids June 22, 1950 (7779)

Water Distribution & Sanitary Sewerage System & Plant

Sealed proposals will be received by the Hummels Wharf Municipal Authority, at Monroe Township Consolidated School, Hummels Wharf, Snyder county, Pennsylvania, until 8:00 o'clock P.M. (Eastern Daylight Saving Time) on Thursday, June 22, 1950, at which time and place the bids will be opened and publicly read for the Construction of Water Distribution System, Sanitary Sewerage System and Sewage Treatment Plant. Copies of the Plans, Specifications and other Contract Documents can be obtained from Richard J. Hartman, Consulting Engineer, 322 North Third Street, Harrisburg, Pennsylvania upon a deposit of $25.00 for each set of documents. If the documents are returned in good condition within five (5) days after the opening of the bids, the full amount ($15.00) of the deposit for the set will be returned. If the documents are not returned within the time specified, the amount of the deposit for the set will be retained. A certified check in the amount of $12,000.00 must be submitted with the proposal as bid security. No bid may be withdrawn for thirty (30) days after the scheduled closing time for receipt of bids.

The Hummels Wharf Municipal Authority of Hummels Wharf reserves the right to waive any irregularities or reject any or all bids.

Leon N. Messner, Secretary
Hummels Wharf Municipal Authority
Hummels Wharf, Pennsylvania

Bids July 14, 1950 (7778)

Plumbing

BETHLEHEM, PA.

NOTICE TO BIDDERS

Contract No. 3

Sealed proposals addressed to the Bethlehem Authority of the City of Bethlehem, Pa. for Plumbing for Sewage Treatment Plant will be received at the office of the Bethlehem Authority, 25 N. New St., Bethlehem, Pa. until 10:00 A.M. Eastern Standard Time on the 14th day of July, 1950 at which time and place the bids will be opened and read.

Plans and specifications entitled as above may be examined at the office of the Bethlehem Authority, 25 N. New St. Bethlehem, Pa. and may be obtained from the office of the Bethlehem Authority, 25 N. New St. Bethlehem, Pa. upon depositing $5.00 which amount will be refunded if a bid is submitted and the plans are returned in good condition. In case no bid is submitted, $5.00 will be refunded if said plans and specifications are returned in good condition within ten days after the receiving of bids by the Authority.

No bidder will be permitted to withdraw his bid for a period of thirty (30) days after the date set for the opening of the bids.

The Bethlehem Authority reserves the right to waive any informality in any bid received and to reject any or all proposals or to accept any bid deemed advisable for the best interests of the City of Bethlehem, Pennsylvania.

Each proposal shall be accompanied by a Certified Check, Bank Treasurer's Check or Cashier's Check in an amount equal at least to five (5) per cent of the total of the bids submitted drawn to the order of the Bethlehem Authority, Bethlehem, Pennsylvania. The bidder to whom a contract is awarded will be required to furnish for the faithful performance of the work under this contract an approved Surety Company Performance Bond in an amount equal to one hundred (100) per cent of the bid and a separate Surety Company Labor and Materialmen's Bond in an amount equal to fifty (50) per cent of the total of the bid as submitted.

Bethlehem Authority
Bethlehem, Pennsylvania
By W. R. COYLE, CHAIRMAN
ROBERT L. FOX, Executive Director

Bids July 14, 1950 (7777)

Heating and Ventilating

BETHLEHEM, PA

NOTICE TO BIDDERS

Contract No. 4

Sealed proposals addressed to the Bethlehem Authority of the City of Bethlehem, Pa. for Heating and Ventilating for Sewage Treatment Plant will be received at the office of the Bethlehem Authority, 25 N. New St. Bethlehem, Pa. until 9:00 A.M. Eastern Standard Time on the 14th day of July, 1950 at which time and place the bids will be publicly opened and read.

Plans and specifications entitled as above may be examined at the office of the Bethlehem Authority, 25 N. New St. Bethlehem, Pa. and may be obtained from the office of the Bethlehem Authority, 25 N. New St. Bethlehem, Pa. upon depositing $5.00 which amount will be refunded if a bid is submitted and the plans are returned in good condition. In case no bid is submitted, $5.00 will be refunded if said plans and specifications are returned in good condition within ten days after the receiving of bids by the Authority.

No bidder will be permitted to withdraw his bid for a period of thirty (30) days after the date set for the opening of the bids.

The Bethlehem Authority reserves the right to waive any informality in any bid received and to reject any or all proposals or to accept any bid deemed advisable for the best interests of the City of Bethlehem, Pennsylvania.

Each proposal shall be accompanied by a Certified Check, Bank Treasurer's Check or Cashier's Check in an amount equal at least to five (5) per cent of the total of the bids submitted drawn to the order of the Bethlehem Authority, Bethlehem, Pennsylvania. The bidder to whom a contract is awarded will be required to furnish for the faithful performance of the work under this contract an approved Surety Company Performance Bond in an amount equal to one hundred (100) per cent of the bid and a separate Surety Company Labor and Materialmen's Bond in an amount equal to fifty (50) per cent of the total of the bid as submitted.

Bethlehem Authority
Bethlehem, Pennsylvania
By W. R. COYLE, CHAIRMAN
ROBERT L. FOX, Executive Director

Bids July 14, 1950 (7776)

Electric Power, Control and Lighting System

BETHLEHEM, PA

NOTICE TO BIDDERS

Contract No. 2

Sealed proposals addressed to the Bethlehem Authority of the City of Bethlehem, Pa. for Electric Power, Control and Lighting for Sewage Treatment Plant will be received at the office of the Bethlehem Authority, 25 N. New St. Bethlehem, Pa. until 8:00 A.M. Eastern Standard Time on the 14th day of July, 1950 at which time and place the bids will be opened and read publicly.

Plans and specifications may be examined at the office of the Bethlehem Authority, 25 N. New St. Bethlehem, Pa. and may be obtained from the office of the Bethlehem Authority, 25 N. New St. Bethlehem, Pa. upon depositing $5.00 which amount will be refunded if a bid is submitted and the plans are returned in good condition. In case no bid is submitted, $5.00 will be refunded if said plans and specifications are returned in good condition within ten days after the receiving of bids by the Authority.

No bidder will be permitted to withdraw his bid for a period of thirty (30) days after the date set for the opening of the bids.

The Bethlehem Authority reserves the right to waive any informality in any bid received and to reject any or all proposals or to accept any bid deemed advisable for the best interests of the City of Bethlehem, Pennsylvania.

Each proposal shall be accompanied by a Certified Check, Bank Treasurer's Check or Cashier's Check in an amount equal at least to five (5) per cent of the total of the bids submitted drawn to the order of the Bethlehem Authority, Bethlehem, Pennsylvania. The bidder to whom a contract is awarded will be required to furnish for the faithful performance of the work under this contract an approved Surety Company Performance Bond in an amount equal to one hundred (100) per cent of the bid and a separate Surety Company Labor and Materialmen's Bond in an amount equal to fifty (50) per cent of the total of the bid as submitted.

Bethlehem Authority
Bethlehem, Pennsylvania
By W. R. COYLE, CHAIRMAN
ROBERT L. FOX, Executive Director

OFFICIAL PROPOSALS

Bids June 15, 1950 (7782)

Sewerage Treatment Plant

TOWNSHIP OF LIVINGSTON,

NEW JERSEY

NOTICE TO CONTRACTORS

Bids will be received by the Township Committee of the Township of Livingston, New Jersey on June 15, 1950, at 8 P.M. Eastern Daylight Saving Time, for the construction of Contract XIII, Extension, Sewage Treatment Plant.

Information may be obtained at the offices of Rowe, Albertson & Associates, Engineers, 116 William Street, New York, New York and at the office of the Township Clerk, 213 South Livingston Avenue, Livingston, New Jersey, and copies of the plans and specifications may be obtained at the office of the Engineers upon the deposit of the sum of [illegible] ($ [illegible]) Dollars, which deposit will be returned to the bidder upon the return of the plans and specifications in good condition within ten days after the opening of bids.

Each bid must be accompanied by a certified check, bank treasurer's check or cashier's check in an amount equal at least to five per cent of the bid submitted, drawn to the order of the Township Committee of the Township of Livingston, New Jersey.

The successful bidder will be required to furnish a performance bond in the amount of 100% of the contract price, and a labor and materials bond in the amount of 50% of the contract price, with a surety company approved by the Township Committee.

The Township Committee reserves the right to reject any or all bids.

TOWNSHIP COMMITTEE
Township of Livingston, New Jersey
By T. Clyde Reed
Chairman

(Continued on page 80)

The CONTRACTOR—
like a GENERAL
Prepares for Victory

B[illegible] he goes into battle on a new [illegible] he is sure that by means of construction [illegible] is equipped.

[illegible] (see ENGINEERING NEWS RECORD) is sure, for he has a new type of rubber-tired wheel scraper. Looks into their success on other jobs and orders them. He uses a crawler crane, which is partly [illegible] of wiring shop, some of the [illegible] are using every day.

He contracts for one to be delivered to the new job. New developments in wire rope [illegible] and all sizes, and the parts or suggestions to go of [illegible] special plant at low cost and other features that save time and money are there to picture and list.

And CONTRACTOR, who not only sees the proposals for new jobs, but who knows the news of the manufacturers in the [illegible] advertising pages, get the most out of their ENGINEERING NEWS-RECORD.

They are the men who are able to estimate a job close enough to "land it" and win success today on the contract.

OFFICIAL PROPOSALS
(Continued from page 79)

(784)

New Jersey Turnpike Authority

Sealed proposals will be received by the New Jersey Turnpike Turnpike Authority for the following contracts:

CONTRACT NO. 23

The work to be performed under this Contract involves the construction of nine (9) steel and concrete structures, cross street paving and incidental work in connection with the construction of the New Jersey Turnpike, Section 2, between Woodbury Heights and Hartford, in Gloucester, Camden and Burlington Counties, New Jersey.

Principal items of work include:

Excavation and Grading	47,000 Cu. Yds.
Concrete	11,000 Cu. Yds.
Reinforcement Steel	1,420,000 Pounds
Structural Steel	2,500,000 Pounds
Concrete Bearing Piles	60,000 Lin. Ft.
Metal Bridge Railing	3,000 Lin. Ft.
Pavement	55,000 Sq. Yds.
Topsoiling	112,000 Sq. Yds.
Pipe Culvert	1,400 Lin. Ft.

Contract Documents may be seen, and may be inspected by prospective bidders during office hours, after May 28, 1950 at the office of the New Jersey Turnpike Authority, 65 Prospect Street, Trenton 8, New Jersey and at the office of the Engineer, Gannett Fleming Corddry and Carpenter, Incorporated, 600 North Second Street, Harrisburg, Pennsylvania and Old Barrington Airport, Barrington, New Jersey.

* * *

CONTRACT NO. 25

The work to be done under this Contract involves the construction of the substructures and superstructure of the Pulaski Turnpike Overpass south of the Raritan River and the P. R. R. & W. Railroad Overpass, north of Secaucus Hill, and other incidental work all in connection with the construction of the New Jersey Turnpike, in Hudson County, New Jersey.

Principal items of work include:

Open Foundation Excavation	2,300 Cu. Yds.
Concrete	4,200 Cu. Yds.
Reinforcement Steel	472,000 Lbs.
Steel Piles	7,500 Lin. Ft.
Structural Steel	2,200,000 Lbs.
Wrought Iron Bird Poles	35,000 Lbs.
Metal Railing	500 Lin. Ft.
Bituminous Pavement	1,100 Sq. Yds.

Contract documents may be seen, and may be inspected by prospective bidders during office hours after May 29, 1950 at the office of the New Jersey Turnpike Authority, 65 Prospect Street, Trenton 8, New Jersey and at the office of the Consulting Engineers, Howard, Needles, Tammen & Bergendoff, 1 Liberty Street, New York, New York.

* * *

Proposals will be received at the office of the New Jersey Turnpike Authority, 65 Prospect Street, Trenton, New Jersey, on the forms furnished by the Authority, and must be filed in the Secretary's Room of the War Memorial Building, Memorial Park, at Willow Street, Trenton, New Jersey, until 11 o'clock A.M.D.S.T. on the said date at which time and place they will be publicly opened and read.

Contract documents will be furnished to each bidder upon application to the Authority. The payment will not be refunded and each bidder will be charged the cost of same.

The receipt and opening of proposals is subject to proper qualification of the bidder in accordance with the requirements of the New Jersey Turnpike Authority. Bidding blanks will be furnished only to those who have been pre-qualified and a current statement must be on file in the office of the Authority.

Proposals must be made upon the forms and proposal forms in the manner prescribed in the standard specifications for construction of the New Jersey Turnpike and must be enclosed in sealed envelopes addressed to the Authority at the place designated above on or before the hour named. Copies of the proposal form to be used for submitting proposals, of the form for the proposal bond, of the form to be used for the financial statement and for the plan and equipment statement to be submitted with the proposal and of the special addressed envelope are furnished to bidders with the contract documents.

Contracts will be awarded, or the proposals rejected within fifteen (15) days from the date of opening proposals. The right is reserved to reject any or all proposals.

NEW JERSEY TURNPIKE AUTHORITY
Paul L. Troast,
Chairman

May 24, 1950

Bids: June 12, 1950 (785)

Access Roads and Landscaping for Temporary Terminal Buildings

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
CONTRACT NYA-129

Sealed proposals for the construction of access roads and landscaping for the Temporary Terminal Buildings at New York International Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 8th Ave., New York 11, N. Y., until 11:30 A.M. Monday, June 12, 1950, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Chief Engineer and copies will be furnished upon deposit of $10 per set. The deposit will be refunded if the documents are returned in good condition, not later than 30 days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman

New York, June 1, 1950

Bids: July 14, 1950 (775)

Pumping Equipment

BETHLEHEM, PA
NOTICE TO BIDDERS
SEWAGE TREATMENT PLANT
CONTRACT NO. 2

Sealed proposals addressed to the Bethlehem Authority at the City of Bethlehem, Pa., for Sewage Pumping Equipment and Appurtenances for Sewage Treatment Plant will be received at the office of the Bethlehem Authority, 328 N. New St., Bethlehem, Pa. until 9:00 A.M. Eastern Standard Time on the 14th day of July 1950. At which time and place they will be publicly opened and read.

Plans and specifications, form of contract and bidding blanks are on file and may be obtained at the office of the Bethlehem Authority, 328 N. New St., Bethlehem, Pa. for a deposit of $25.00 which amount will be refunded if a bid is submitted and the plans are returned in good condition. In case no bid is submitted, $10.00 will be refunded if said plans and specifications are returned in good condition within two weeks of the date set for the opening of bids by the Authority. No bidder will be permitted to withdraw his bid for a period of thirty (30) days after the date set for the opening of the bids.

The Bethlehem Authority reserves the right to waive any informality in any bid or to reject any or all proposals or to accept any bid deemed advantageous for the best interests of the City of Bethlehem, Pennsylvania.

Each proposal shall be accompanied by a Certified Check, Bank Treasurer's Check or Cashier's Check made payable to the order of the Bethlehem Authority, Bethlehem, Pennsylvania, in an amount equal to five (5) per cent of the total of the bid, certified drawn to the order of the Bethlehem Authority, Bethlehem, Pennsylvania, which shall be forfeited to the Authority as liquidated damages in case the bidder to whom the contract is awarded shall fail to enter into the contract and furnish satisfactory surety within ten (10) days after the prescribed forms are presented to him for signature. Bond in an amount equal to one hundred (100) per cent of the total of the bid as submitted, with surety company approved by the Authority, will be required of the successful bidder. Bidder must be prepared to furnish a Labor and Materialmen's Bond in an amount equal to fifty (50) per cent of the bid submitted.

Bethlehem Authority
By W. R. COYLE, CHAIRMAN
ATTEST: J. E. RON, Executive Director

OFFICIAL PROPOSALS

Bids: June 16, 1950 (780)

Alterations and Addition to Present School Building

NOTICE TO CONTRACTORS
TOWN OF PENFIELD, MONROE
COUNTY, NEW YORK

Subject to approval of plans and specifications by the State Education Department, Albany, New York, separate sealed bids for General Construction Work, Heating and Ventilating Work, Plumbing Work, and Electrical Work for alterations and additions to the present school building, development of the grounds and sewage disposal, in accordance with plans and specifications, will be received by the Board of Education of the Penfield Central School, Town of Penfield, Monroe County, New York, at the office of the present school, Five Mile Line Road, Penfield, New York, until 1:00 o'clock P.M., June 16, 1950, at which place and hour they will be publicly opened and read aloud.

The Information for Bidders, Form of Bid, Plans, and Specifications may be examined at the office of Carpenter and Hartman, Architects, 10 Reynolds Arcade, Rochester 14, New York, and copies thereof obtained upon deposit of $25.00 for each set. Any bidder, upon returning such set in good condition, will be refunded his deposit and any non-bidder upon so returning such set will be refunded $15.00 unless the return is made before June 7, in which case the $25.00 will be returned.

The Board of Education of the Penfield Central School reserves the right to waive any informalities in or to accept or reject any or all bids.

Each bidder must deposit with his bid security in an amount of not less than five per centum (5%) of the base bid in the form and subject to the conditions provided in the Information for Bidders.

Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under the contract.

Proposals shall be on blank forms furnished by the Architect, prepared as set forth in Information to Bidders, enclosed in a sealed envelope, bearing on its face the name and address of the Bidder and the title of the work to which the enclosed proposal relates.

No bidder may withdraw his bid within 45 days after the actual date of the opening thereof.

Plans available May 24, 1950.

CHARLES HARRIS
District Clerk

Official Proposals Columns of

ENGINEERING NEWS-RECORD

are MUST reading, each week for contractors, engineering-construction companies, equipment and materials manufacturers, all over the United States . . . and used regularly for over 50 years by government, state, county and municipal departments to advertise bids.

Official Proposal Division

Engineering News-Record
330 West 42nd St.
New York 18, N. Y.

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EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

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$1.20 cents a line, minimum 4 lines. To figure advance payment count 5 average words as a line.
INDIVIDUAL EMPLOYMENT WANTED undisplayed advertising rate is one half of above rate, payable in advance.
PROPOSALS: $1.00 a line an insertion.

INFORMATION:
BOX NUMBERS, care publication New York, Chicago or San Francisco offices count as 3 line additional on undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:
The advertising rate is $11.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. E.N.R.

NEW ADVERTISEMENTS received by June 5th at the New York Office 330 W. 42 St., N. Y. 18, will appear in June 15th issue subject to space available.

CONSTRUCTION PERSONNEL

FOREIGN SERVICE BUREAU
P. O. Box 295 Metuchen, N. J.

BOLT and NUT SALESMAN

Heavy Hardware Manufacturing Company offers position to salesman experienced in contacting general contractors.

BW-6539

ESTIMATOR

Wanted by established Pittsburgh firm of commercial and industrial contractors. Must have had experience with contractors engaged in similar work. State salary, experience and when available. Splendid opportunity for advancement.

P-6496

POSITIONS VACANT

POSITIONS WANTED

ENGINEER, LICENSED
in New York State
Also Sales Engineer

Experienced in bridge construction and alterations. Permanent position for right man. Reply stating experience to

P-6506

GRAVEL PLANT SUPERINTENDENT

Wanted for operating and managing portable and permanent plants in Indiana and Michigan. State experience, references and salary.

P-6505

CITY OF DETROIT

Detroit Civil Service Commission
1501 Water Board Bldg.
735 Randolph Street, Detroit 26, Mich.

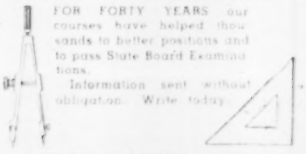
PART TIME WORK WANTED

SELLING OPPORTUNITY OFFERED

SELLING OPPORTUNITY WANTED

STRUCTURAL ENGINEERING

A Course of Instruction by Mail



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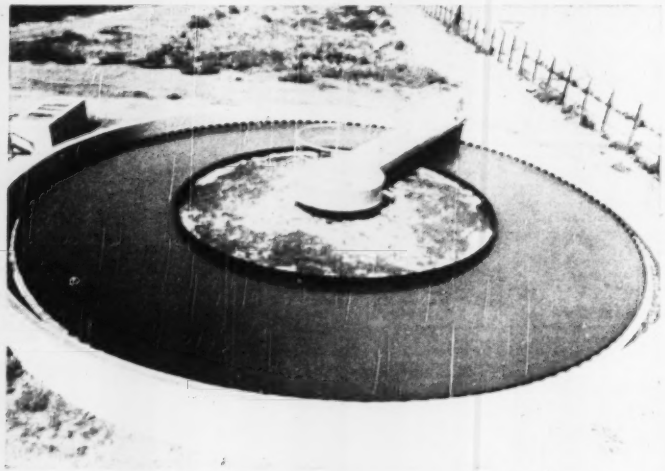

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(Continued on page 91)

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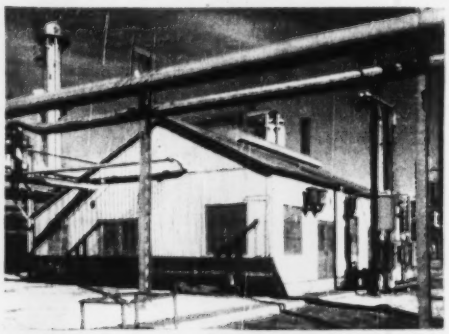

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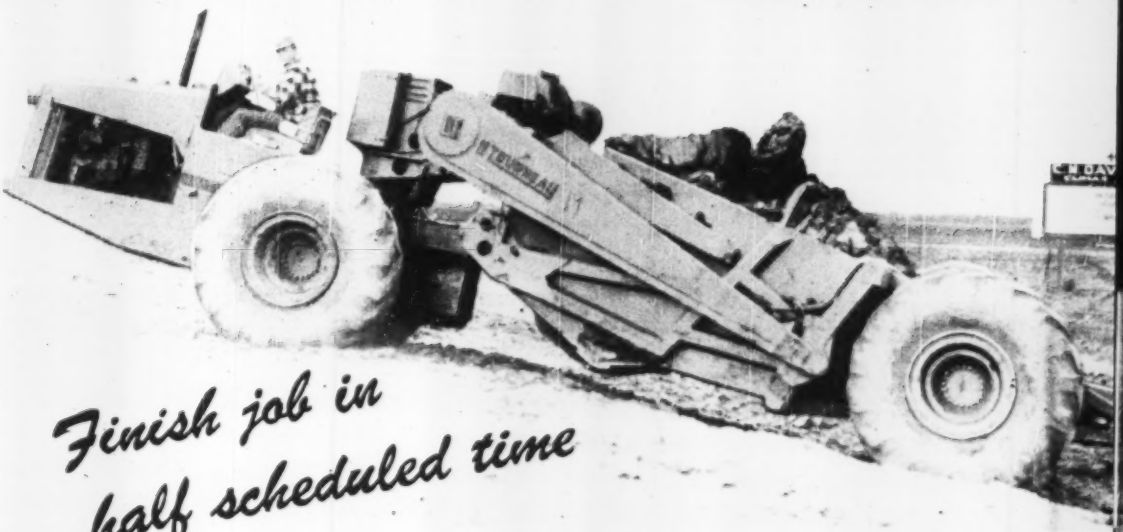

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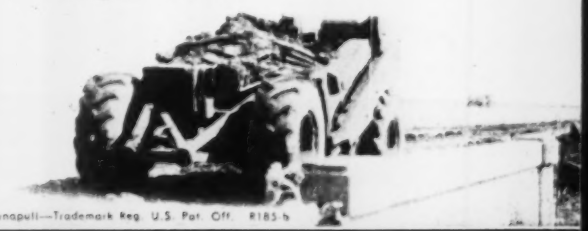

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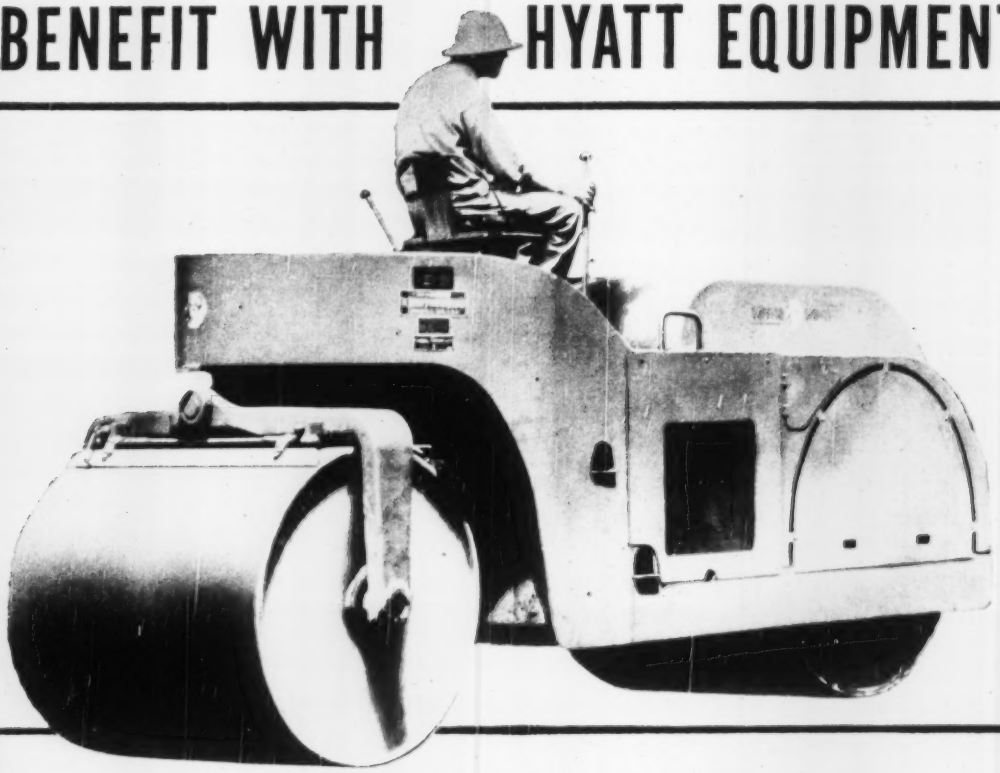

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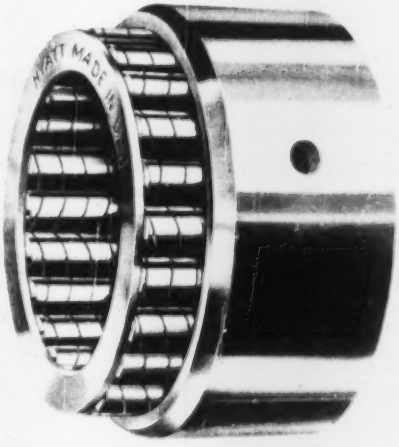

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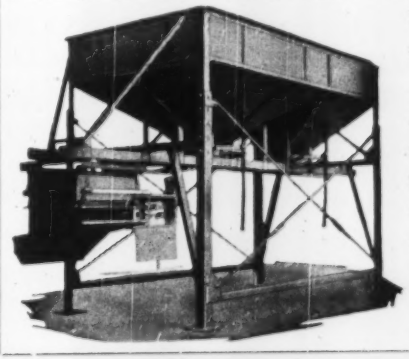

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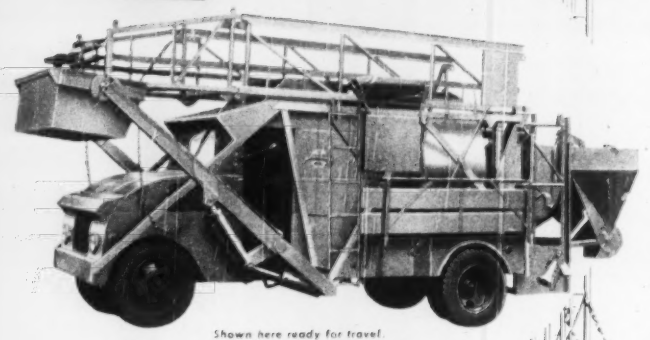

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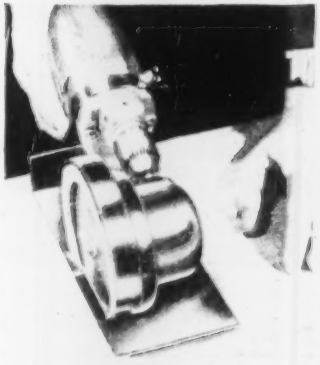
tion is mechanical and positive the moment engine is started.—Lindberg Agricultural Sprayer Co., 5155 Loraine Ave., Detroit 8, Mich.

Horizontal-Sliding Window

Aluminum window of the horizontal sliding type has sliding panel supported on two rollers. Features include: No putty is used in installation, no painting is required, and no sash balances, operating cranks, or projecting hinges are involved in the design. A high pile, woven, wear-resistant and practically frictionless "weatherstrip" is used to eliminate metal to metal contact and scratching. Washing is simplified by the fact that sliding panels lift out and all washing is done from inside the room. These units make possible using windows in continuous spans of any length without danger of buckling due to unequal expansion of aluminum and masonry.—Burke Barrette Co., Inc., 8544 Grand River, Detroit 4, Mich.



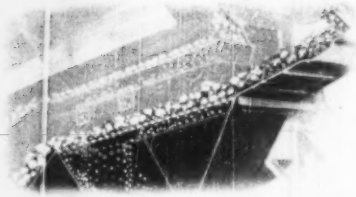
Saw Attachment for Drills

Attachment converts any 1-in. electric drill into a portable circular saw. Visual guide enables operator to see where he is cutting, while extra-wide shoe plate guides the saw and minimizes crimping. The Ball Saw can also be converted into a right-angle buttering tool.—D. A. Buckeye Engineering Co., 3128 Main St., Kansas City, Mo.

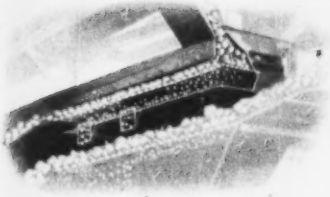
Diesels With Higher Ratings

Increased horsepower and improved performance are features of the new

(Continued on page 96)



WITH BOTTOM DECK FEED only pit run is fed to the bottom deck of the 3½ deck screen. Half deck rejects sand. Pit run specification goes to pay hopper without going through a crusher . . . passes through only one screen. Oversize goes to jaw crusher.



ONLY CRUSHED MATERIAL is screened on the top deck. Specification material is by-passed around the bottom deck to the pay hopper. It does not pass through the bottom deck. No scalping screen is necessary. Stone chips can be produced if desired.

How a twist of the wrist increases production with BDF

IN YOUR BUSINESS, time is measured in rock and gravel tonnage. Every hour of smooth, high speed, uninterrupted production is worth many dollars and cents of profit. *Time is money.*

With the invention of Bottom Deck Feed, Pioneer engineers found an ingenious way to pack more productive hours into every working day. This is done by eliminating the necessity of frequent screen changes . . . by permitting continuous adjustment of balance between the roll crusher and the jaw crusher — just a twist of the wrist — *while the plant is in operation.* (See detail at right)

And because the top and bottom decks both produce specification material independently, bottom deck feed can actually double the effective screening capacity of a plant. (See details above)

If you believe "one gravel plant is as good as another", send for our catalog on bottom deck feed plants. It shows in detail how this series of portable plants will out-produce any other plants built today. PIONEER ENGINEERING WORKS, 1515 Central Avenue, Minneapolis 13, Minnesota.

THE FLOW OF MATERIAL throughout the plant is regulated by a simple ratchet adjustment on the jaw crusher. If the material is coarse and the jaw is overworked, open the jaw slightly and send a larger product to the roll crusher. If the material is fine, close the jaw. You don't have to stop the plant to change screens. A twist of the wrist does it.

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1515 Central Avenue • Minneapolis 13, Minnesota

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GRAVEL PLANTS	WASHING PLANTS	MECHANICAL FEEDERS
ROCK PLANTS	BITUMINOUS PLANTS	VIBRATING SCREENS
JAW CRUSHERS	APRON FEEDERS	BUZZER SCREENS (light duty)
ROLL CRUSHERS	GRID FEEDERS	CONTINUOUS CONVEYORS

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Company

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City Zone State

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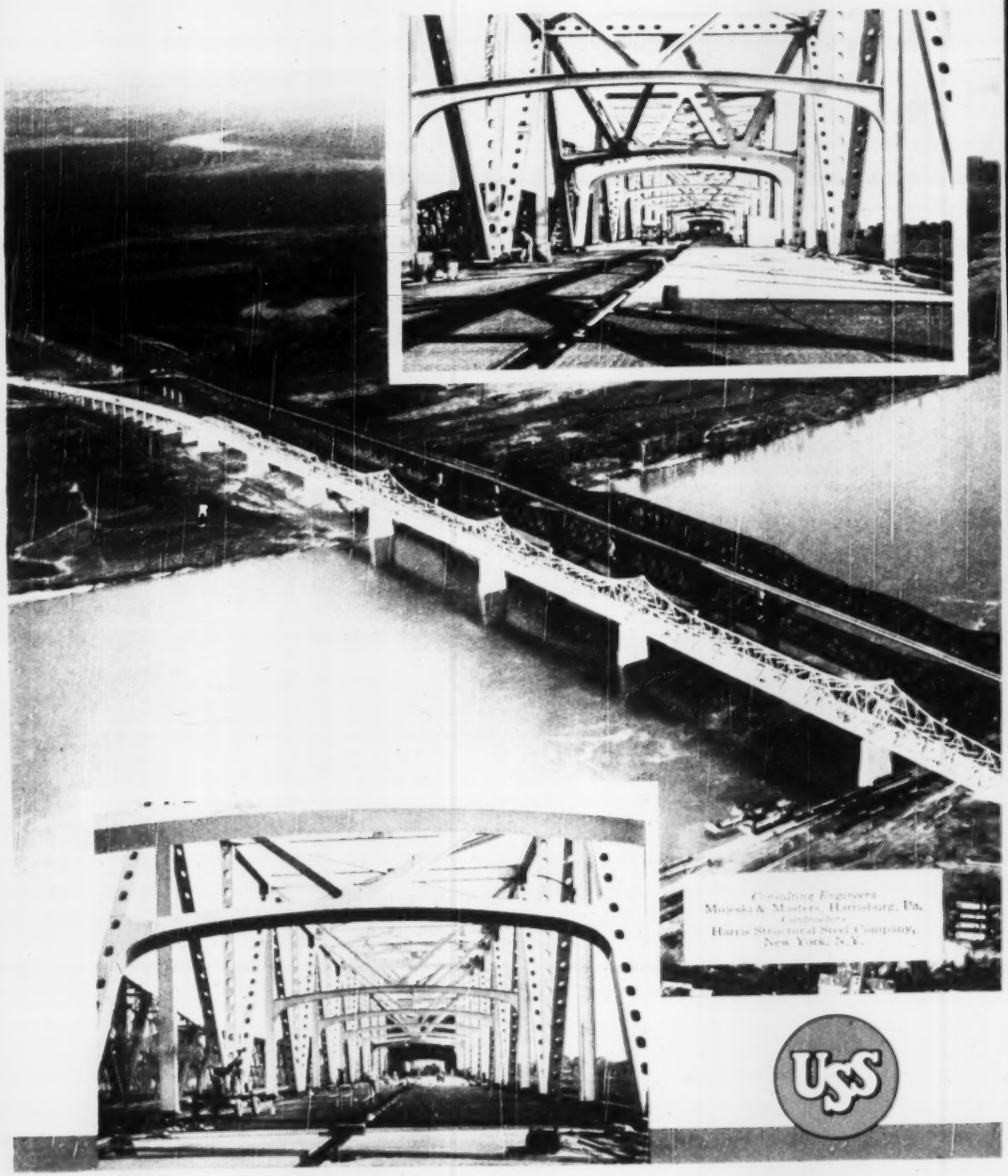
Pioneer *Continuflo* **EQUIPMENT**

Newest and Largest Bridge Floored with 167,000 Sq.Ft.



Consulting Engineers
Modjeski & Masters, Harrisburg, Pa.
Contractors
Harris Structural Steel Company,
New York, N.Y.

USS

over Mississippi River of U·S·S I-BEAM-LOK!

Nearly a mile long, the giant new cantilever structure spanning the broad Mississippi at Memphis is the latest and largest bridge over this great river.

Designed to take ample care of both present and foreseeable future heavy, high-speed traffic, this wide four-lane bridge (officially named the Memphis and Arkansas Bridge) has two 24-ft. roadways of concrete-filled U·S·S I-BEAM-LOK Steel Flooring extending 3,694 ft. of its length with a total of 167,000 square feet.

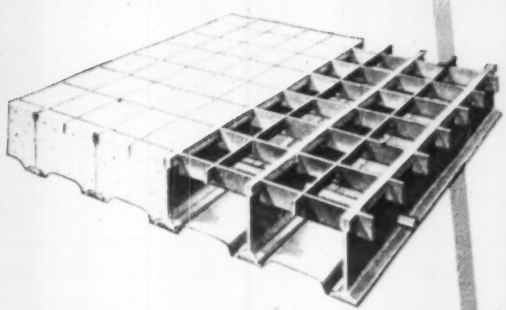
The selection of U·S·S I-BEAM-LOK for this big bridge further indicates the over-all economies resulting from the use of this type of lightweight steel flooring. Leading bridge and highway engineers continue to prefer U·S·S Armored I-BEAM-LOK where it is necessary to reduce the cost of foundations and super-structure.

Not only does the concrete-filled grid of I-BEAM-LOK provide a smooth-riding, safe, skid-resisting, fire-proof and long-life surface, but it requires less maintenance than other flooring. Furthermore, it can be erected easily and speedily. In the re-flooring of existing bridges, its lightweight and great strength often make it possible to increase H-load ratings without major changes in existing bridge structures, and interruption of traffic is held to a minimum.

U·S·S I-BEAM-LOK is available in both concrete-filled and open types. The concrete-filled type comes in 3" and 4½" sizes and in weights of only 47 and 55 lbs. per square foot. The open type flooring is even lighter, it weighs approximately 18.9 lbs. per sq. ft. as installed.

To find out more about this "modern floor for modern traffic," contact the office nearest you. Our engineers will be glad to discuss its possibilities with you.

CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH • COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM • UNITED STATES STEEL EXPORT COMPANY, NEW YORK



U·S·S I-Beam-Lok combines all of these important Advantages:

1. VERY LIGHT UNIT WEIGHT, thus reducing dead load and the ultimate cost of completed bridge.
2. GREATER RIGIDITY OF ENTIRE ROADWAY. Positive connection between slab and stringers.
3. EASE OF ERECTION, with no concrete forms necessary. Saves time in completion of structure.
4. SMOOTH HARD SURFACE for safe, high-speed traffic.
5. LOW MAINTENANCE COSTS. Bridge floors of U·S·S Armored I-Beam-Lok have averaged 15 to 17 years of heavy use before the surface required any maintenance.

U·S·S I-BEAM-LOK STEEL FLOORING

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"BERG"

CONCRETE SURFACER MODEL A

"Berg" equipment is used extensively for surfacing and finishing applications on concrete construction.

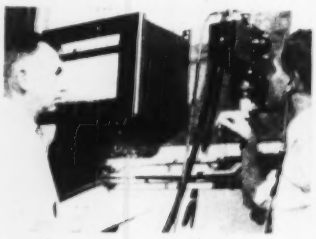
The many "BERG" Models available, permit exact selection for your particular application.

The distinctive "BERG" features give you the kind of results that are realized in better quality work, combined with lower costs.

"BERG" Heads and Attachments are interchangeable, thereby providing adaptability for vibrating, wire brushing, sanding and polishing applications.

THE CONCRETE SURFACING MACHINERY CO.
4667 SPRING GROVE AVE.
CINCINNATI 32, OHIO

Caterpillar International "9" Series of diesel power units and automotive engines. As a power unit, the UD9A delivers 62.5 hp. at 1,600 rpm under intermittent load. Weight is 2,060 lb. The UD 9A operates at governed speed of 1,800 rpm, delivering 70 hp at that speed. Weight is 1,500 lb. Both units have an inbuilt gasoline-conversion all-weather starting system and full-pressure lubrication of moving parts.—INTERNATIONAL HARVESTER CO., 180 N. MICHIGAN AVE., CHICAGO 1, ILL.



Recording Turbidimeter

Photoelectric instrument automatically measures and records amount of suspended particles in a liquid. The recording turbidimeter provides a means for monitoring and controlling processes in water-treatment plants or wherever turbidity is a significant condition of the process. Results are not subject to variations in color of liquids. The instrument will read any desired range of turbidity such as 0 to 10 ppm., 100 to 1,000 ppm., 900 to 100 ppm., etc. Operating on a 115-v, 50-60 cycle circuit, the equipment has a power consumption of approximately 150 watts.—GENERAL ELECTRIC CO., APPARATUS NEWS BUREAU, SCHENECTADY 5, N. Y.

Light, Medium-Duty Trucks

Line of light and medium-duty trucks is available in 10 models with gross vehicle weights to 21,500 lb. Tractor-trailer units are available in weights to 42,000 lb. Wheelbase lengths in the Stake Line series range from 120 to 250 in. Cab-to-axle dimensions are 60 to 174 in. Cab seats are 50 in. wide. Mechanical improvements include wider track front axle and shorter wheelbases for shorter turning radius and front and rear springs have been lengthened. Wheel and tire capacities and ratios in single-speed, two-speed, and two-speed double-reduction final drive are available. A choice of four engines provides ratings to 126 hp.—FEDERAL MOTOR TRUCK CO., DETROIT 9, MICH.

Fire-Retardant Coating

Chemical fire retardant is designed for spraying on walls, fiberboard partitions, wood, textiles, and other materials. Heat of a fire on treated article liberates a non-irritating non-toxic gas which dilutes and cools the products of combustion to below their spontaneous ignition point. At the same time, Flamort produces a glaze and char-like coating at the area contacted by the flame. Tendency to smolder is eliminated. Flamort powder is packed in fiber drums and wooden kegs; solutions are sold in quart and gallon bottles, and in 5, 10, 16, 30, and 50-gal kegs.—FLAMORT CHEMICAL CO., 746 NATOMA ST., SAN FRANCISCO 3, CALIF.

High-Lift Hydraulic Loader

Dumping height of 13 ft 6 in. (to lowest point on bucket) is feature of the Model 100, Type GL Dempster-Diggster. This Diggster has a crowd reach of 10 ft 6 in., and will dig through an 18ft bank. The Dempster-Diggster operates with hydraulic crowd and hoist action, and is available with crawler-type traction.—DEMPSTER BROS., INC., KNOXVILLE, TENN.

New Product Briefs

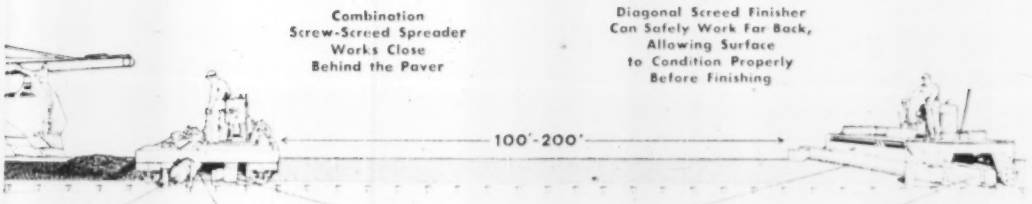
Right-angle-drive power unit permits drilling between 12-in. center joints, and in other close or obstructed places. Maker: Milwaukee Electric Tool Corp., Milwaukee 8, Wis.

Pressure-fed hand paint brush is fed through a hose connected to the handle. Feature is that it eliminates constant stopping and dipping into a paint pot. Maker: Hanlon Goodman Co., Belleville 9, N. J.

Jaeger 3-Screed Paving Team

(Accurate Metering Screed on the Spreader,
Transverse Screed and Diagonal Screed on the Finisher)

gets faster production and labor-savings never before possible on concrete slab



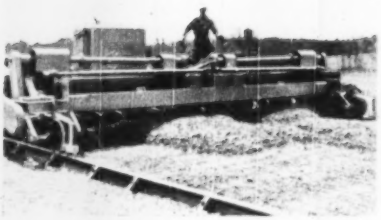
Re-mixing spreader screw: Reworks, compacts and spreads material evenly from form to form.

Initial strike-off to approximate grade (all that any other spreader can accomplish)

No. 1 — Metering screed Makes precision strike-off with 12" oscillating shoe. Corrects any excess or deficiency left by initial strike-off. Saves cost of shovelers for carry back and far costlier back tracking with the paver.

No. 2 — Transverse Screed: Works with just the right roll of material as "metered" by the Spreader. No piles to buck. Uniform compaction at all times.

No. 3 — Diagonal Screed: Pivots to any angle needed to carry material up hill on pitched slab or super-elevated curves, compacts it solidly against higher form. Corrects any irregularities left by transverse screed because it meets material at different point. Also finishes stiff mixes without tearing.



Note how the above Jaeger method fully mechanizes your operation, effects direct labor savings in front and in back of finisher, and insures faster, steadier, easier production of the maximum daily yardage your dual drum pavers can produce. Has eliminated requirement of a second finisher behind the spreader on high production work in several states.

Jaeger Type CSS Combination Screw-Screed Spreader: The only spreader that positively eliminates segregation and improves uniformity by remixing on the subgrade — and also accurately meters to the finishing machine by second strike-off with 12" oscillating screed. Same machine can both spread and finish concrete base for bituminous surfaced city streets. Widths 10-15, 20-25 ft. Also available without oscillating metering screed, if so desired.

Jaeger Type X Diagonal Screed Finisher: The only finishing machine that can finish flush to higher form on pitched slab and super-elevated curves. Screed angle instantly adjustable as required. Angle finishing also averages out any irregularities left by front screed and finishes stiff concrete without tearing. Widths 10 to 32 ft.

Ask your Jaeger distributor or send for complete Concrete Paving Catalogs

THE JAEGER MACHINE CO., Columbus 16, Ohio

BITUMINOUS PAVERS

AGGREGATE SPREADERS

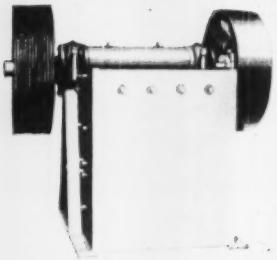
JAEGER

engineered equipment

PUMPS • MIXERS • COMPRESSORS • HOISTS

ROGERS

BETTER ROCK PRODUCTS
BY STAGED REDUCTION



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ROGERS JAW CRUSHER

• Greater Capacity • Less Maintenance • 18 Sizes

Extra tons of reliable production—that's what you get from a Rogers Jaw Crusher. Special long jaws really chew up the boulders: 6 primary, 12 secondary sizes up to 32 x 40 in. Husky, oversize shaft and bearings keep them rolling with little or no maintenance.

There is no substitute for staged reduction—Rogers coordinated equipment always gives you the quantity you need in the size you need. Write today for specifications.

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"Gunite" . . . . . the sand-cement product of the "CEMENT GUN," for Concrete and Masonry Repairs, Pre-Stressed Tanks, Steel Encasement and for lining Reservoirs, Sewers and Tunnels.

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GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.
MANUFACTURERS OF THE "CEMENT GUN"

Manufacturers' Publications

Safety-Training Film—This film is designed to convince workmen that it's smart to wear safety glasses. It shows which glasses are best for specific jobs, presents case histories of injured workers, and the dramatic testimony of blind persons. Film is available on 35 mm sound slidefilm, or in a new form for 16-mm sound-motion projectors. —National Safety Council, 20 N. Wacker Drive, Chicago 6, Ill.

Heavy-Duty Power Plants—Specifications for a line of heavy-duty power plants is described in this 4-p data folder. Specifications listed include model, number of cylinders, bore and stroke, rpm's, piston displacement, compression ratio, maximum torque, and maximum brake hp. The figures are listed for each type of fuel which can be used (natural gas, 70-octane gasoline, distillate, or liquid-petroleum gas). Photographs show typical applications.—Minneapolis Moline Co., Minneapolis 1, Minn.

Torque-Arm Speed Reducer—Brochure simplifies selection of torque-arm speed reducer. Bulletin A-450 (16 ppr) presents the complete story, augmented by full-size photos, of the entire mechanism and simplified selection table. The only information required to select proper size reducer is horsepower required and the speed and size of shaft to be driven. Also available in the brochure is information on size of belts and sheaves.—Dodge Mfg. Corp., Mishawaka, Ind.

Douglas Fir Plywood—Grades, uses of construction, and properties of plywood are listed in the 22-p 1950 basic catalog for Douglas fir plywood. Among the physical properties listed are nail bearing, acoustical, bending, rigidity, insulation, and condensation. All types of Douglas fir plywood are listed.—Douglas Fir Plywood Assn., Tacoma Bldg., Tacoma 2, Wash.

Arc-Welding Equipment—Folder describes main features and specifications of Heliarc apparatus. Equipment illustrated in Folder E-7015 includes five models of torches for manual and mechanized operation, new argon regulator and argon flow meter, especially designed to give accurate gas flows, ceramic and water-cooled shielding gas cups, electrodes, and argon water shut-off valve. Advantages of the

(Continued on page 101)

New Office Building near Columbus Circle

This new baby skyscraper, on Broadway, between 55th and 56th Streets in New York's Columbus Circle district, was built recently to provide a large, flexible working space for the approximately 2000 employees of the Mutual Life Insurance Company of New York.

The 25-story, air-conditioned structure contains 575,000 sq ft of floor space. Its 2nd to 13th stories are to be utilized by the insurance firm, and the remaining floors will be rentable. The 153 ft x 210 ft building has a facing of limestone, aluminum spandrels and stainless steel trim, and is constructed with set-backs at the 9th, 11th, 13th, 20th, and 22nd floor levels. Its sidewalk will be kept free of snow and ice during winter months by means of heated anti-freeze, circulating through coils of Bethlehem Raybuct steel pipe which are embedded in the concrete.

To build this new member of New York's growing family of notable structures, Bethlehem was called upon for the fabrication and erection of some 6500 tons of steel.

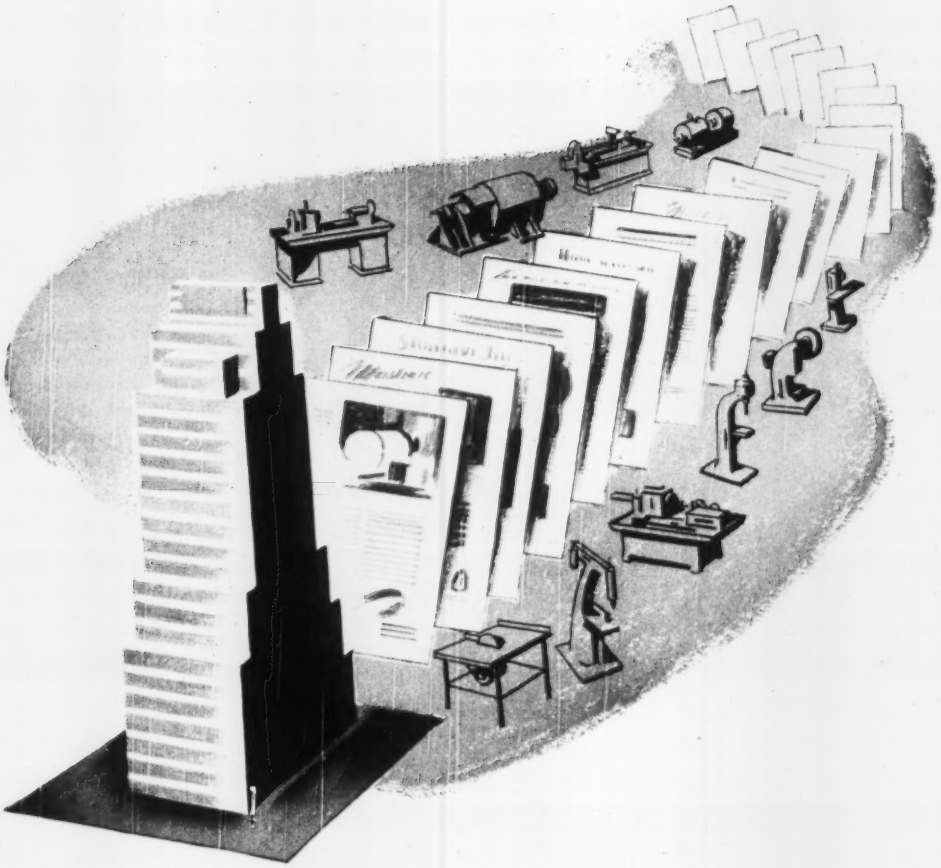
Architects: Shreve, Lamb and Harmon Associates, New York
Consulting Engineers: Edwards & Hjorth, New York
General Contractors: Turner Construction Co., New York

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

FABRICATED STEEL CONSTRUCTION

BETHLEHEM STEEL



The Parade that has no End

As you go through the pages of this magazine . . . or of any other McGraw-Hill publication . . . a colorful parade of advertising pages unfolds before your eyes.

If you are like thousands of other readers of these magazines, you'll become an avid spectator of this interesting educational show. You'll take in the *whole* of this passing parade.

Why? Because this parade is a non-stop exhibition of all that's new in industry—new developments in products and services, new ways for the buyer to make use of these products, news which can often mean the difference between profit and loss to you.

That's why readers of McGraw-Hill magazines are cover-to-cover readers. That's why they're *regular* readers . . . *serious* readers. That's why men say: FOR THE FACTS OF *INDUSTRIAL* LIFE, TURN TO McGRAW-HILL.

McGRAW-HILL

Publishing Company, Inc., 330 West 42nd Street, New York 18, N. Y.

metal-gas shielded arc welding process, and the metals for which it can be used are described, as well as the theory of the process.—The Linde Air Products Co., Div. Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

Wood Foundation Piles—Booklet (16 pp.) assists in proper evaluation of pressure-creosoted foundation piles for various types of construction projects. In reviewing conditions under which wood foundation piles should be pressure-creosoted and the permanent qualities of the treatment, the booklet cites important building codes which allow this type of pile for permanent construction. Typical examples of the use of these piles in various construction projects are described and pictured.—Koppers Co., Inc., Wood Preserving Division, Koppers Bldg., Pittsburgh 19, Pa.

Diesel Engines—Type 4S diesel engine is described in Bulletin 173. This bulletin gives a general description of the design of the engine, low cost fuel requirements, scavenging system, lubrication and piston cooling system, and reversing gear arrangement. The engine is available with ratings from 3,570 to 8,500 hp. and in a marine model.—Nordberg Mfg. Co., Chicago & Oklahoma Ave., Milwaukee 7, Wis.

Industrial Wheel Tractors—Describing the Oliver line of wheel tractors, Catalog A-91S, lists specifications, cross-sections and detailed data on engines and transmissions. One section is devoted to matched allied equipment including bucket-loaders, maintainers, plows, mowers, buckrakes, booms, scrapers, and trenchers. The booklet contains many application photos.—The Oliver Corp., 19300 Euclid Ave., Cleveland 17, Ohio.

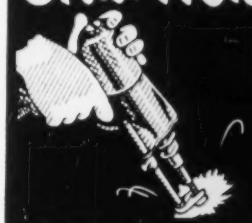
Carbon-Monoxide Recorder—Precise measurement and recording of extremely low concentrations of carbon monoxide in air are possible with the MSA continuous carbon-monoxide recorder described in Bulletin DB-2. The bulletin contains a description of the operation and construction of the unit, including the diving solenoid, motor and pump, circuit of sampler and potentiometer.—Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh 8, Pa.

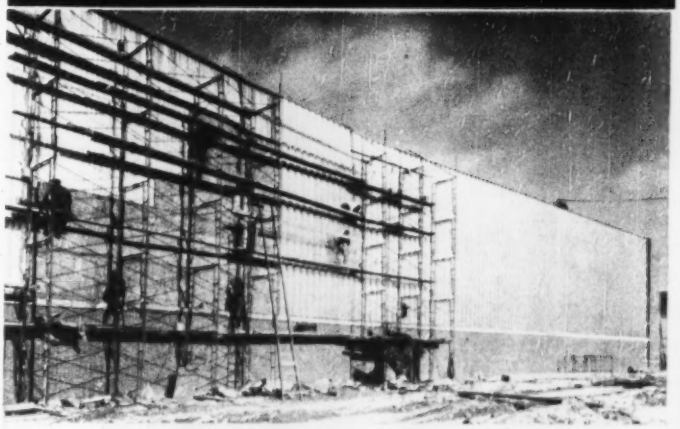
Building Panels—Exterior steel and aluminum building panels are described in a new 8-pp catalog. Panels listed include the Type C for exterior and partition walls, the Type D deck

(Continued on page 103)

Stud Welding gets it On!

BETTER
FASTER
AT LOWER COST





"Breathing" Walls Quickly Secured with Nelson Studs

Stud Welding—the modern method of fastening—plays a prominent, cost-saving role in the construction of Lincoln Electric Company's unique 20-acre plant at Euclid, Ohio.

The building's sidewalls have steel on the interior and box-section aluminum panels on the outside, with insulating board between. Both the panels and the insulation are secured with Nelson studs which are quickly end welded to the steel with the lightweight, easy-to-operate stud welding gun.

For installing most any type of roofing and siding material—corrugated steel, aluminum, asbestos, protected metal, or flat asbestos-cement—the Nelson topside method is *tops*. It's being specified by leading engineers and architects, approved by material manufacturers, and used by alert roofing and siding contractors everywhere.

Nelson studs for securing insulating board are end-welded with the portable stud welding gun in a split-second.
—THE AUSTIN CO., Engineers and Builders.

OPPORTUNITY! Approved Applicator franchises are being awarded to qualified roofing contractors.- Write or wire for details today. Nationwide field engineering service.

SEND FOR BOOKLET
"Nelson Stud Welding in the Construction Industry"

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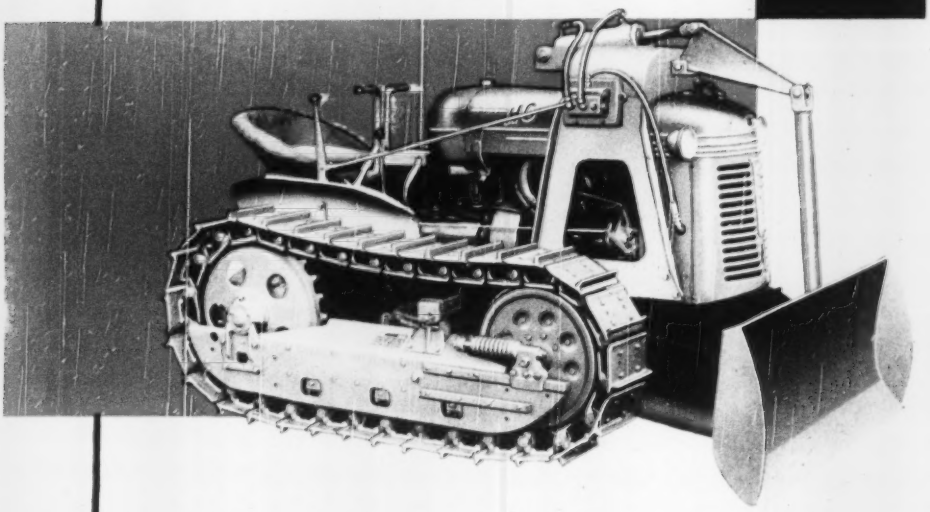
Nelson Stud Welding
DIVISION MORTON GREGORY CORPORATION
2761 TOLEDO AVE. - - LORAIN, OHIO

More *strength . . .* **More** *power . . .* **More** *everything*

..in the NEW OLIVER "HG"



There's *more* of everything you want in a crawler tractor in the NEW Oliver Model "HG." This new little crawler tractor is "big" with performance-making features because it was *field designed* . . . designed to meet the specifications that users said they wanted.

The NEW OLIVER "HG" Has More Strength

To handle the extra load and strains of mounted equipment, the main frame, transmission case and drawbar bracket assembly have been materially strengthened. No loads are imposed on final drive spacer casting. Power take-off is heavier . . . stronger.

Front wheels have been increased 50% in material thickness for longer life. Wheel flanges are on the outside of the track rails for better track alignment. New, heavier type track frame guide supports and buffer springs add strength to handle mounted equipment.

Final drive has been redesigned for greater physical strength and durability.

The NEW OLIVER "HG" Has More Power

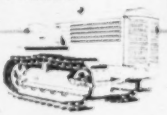
The new "HG" engine gives you more drawbar horsepower . . . extra power to handle bigger loads . . . extra efficiency.

Check the new Oliver "HG" at your Oliver Industrial Distributor's now. It's the biggest little tractor you've ever seen.

THE OLIVER CORPORATION

Industrial Division: 19300 Euclid Avenue, Cleveland 17, Ohio

A complete line of industrial wheel and crawler tractors



and floor panel of cellular-steel construction; the Type AD deck and floor panel; acoustically treated panels; and Holorib steel deck for roof spans up to 8 ft 6 in. The bulletin contains 15 pages of detail drawings, fire resistance ratings, methods of panel electrification, panel selection tables, and specifications.—DETROIT STEEL PRODUCTS CO., 3141 GRIFFIN ST., DETROIT 11, MICH.

Industrial Centrifugal Pumps—Centrifugal pumps for applications involving abrasive or corrosive liquids are described in Catalog 4006. The bulletin describes design principles and construction features of the Nagle pumps, describes three vertical-shaft types, and lists materials of construction employed. It also contains a large section on pump impellers. Complete specifications and dimensions are listed for the entire Nagle line.—NAGLE PUMPS, CANCWOOD HEIGHTS, ILL.

Diatomite Pressure Filters—All information necessary to design a complete water purification plant is listed in Technical Bulletin 1500. This bulletin, 128 pp., contains complete information on diatomaceous earth and its applications to water filtration. The bulletin features piping installation drawings and charts and tables providing engineering design and cost data.—PROPORTIONEERS, INC., PROVIDENCE 1, R. I.

Mechanized Accounting for Contractors—Booklet describes economical mechanized accounting methods for "figure problems." Designed especially for contractors and builders, the booklet shows how error-free job preparation can be achieved. An advantage of the Printing Calculator is that it provides a tape indication of the mathematical functions performed and the figures used. The machine can be used to prepare payrolls, figure volumes and areas, provide data for compensation and governmental reports, and check invoices.—REMINGTON RAND, INC., 315 FOURTH AVE., NEW YORK 10, N. Y.

Brake Linings, Clutch Facings—Friction materials for shovels, draglines, cranes, tractors, and other industrial equipment are described in Catalog FHC-100 (pub.). The bulletin illustrates friction material applications on typical units, lists friction material specifications for equipment manufacturers, gives numerous types of brake lining which the units are equipped, and Grey Rock friction material recommendations for specific parts of various units.—GREY ROCK DIV., RAYBESTOS-MANHATTAN, INC., MANHEIM, PA.

ADVERTISERS IN THIS ISSUE

Aetna Casualty & Surety Co. 49
Allied Steel Products Corp. 88
American Mutual Liability Ins. Co. 52 & 53
American Steel Dredge Co., Inc. 98
Armco Steel Corp. 16

Bethlehem Steel Co. 99
Bucyrus-Erie Co. ..... 14 & 15
Buff & Buff Mfg. Co. 64

Carnegie-Illinois Steel Corp. ..... 94 & 95
Cast Iron Pipe Research Assn., Inc. 50 & 51
Caterpillar Tractor Co. ..... 8 & 9
Cement Gun Co. 98
Central Surety Ins. Co. 75
Chicago Bridge & Iron Co. ..... 2nd cover
Concrete Surfacing Machinery Co. 90

David House Moving Co., E. F. 98
DuPont de Nemours & Co., Inc. 20

Gallon Allsteel Body Co. 55
Goodrich Co., The B. F. 3
Gunite Concrete & Construction Co. 91
Gunite Florida Service, Inc. 53

Hayward Co., The 91
Heltzel Steel Form & Iron Co. 84
Hendrix Mfg. Co. 6
Hyatt Bearings Div., General Motors Corp. 90

Independent Pneumatic Tool Co. 54
Irving Subway Grating Co. 96

Jaeger Machine Co. 97

Kennedy & Morrison Co. 57
Koehring Co., The ..... 10 & 11

LaPlant-Choate Mfg. Co. 1
Lehon Co. 84
LeTourneau, Inc., R. G. 89
Leupold & Stevens Instruments, Inc. 2
Lewman Mfg. Co. 65
Lincoln Electric Co. 18
Link Belt Co. 69

M-Keenan-Terry Co. 63
Mercantile Mfg. Co. 92
Murphy Diesel Corp. 5

Nelson Stud Welding Div., Morton Gregory Corp. 101

Officer Corp., The 102
Owen Bucket Co. 56
Owen Tilting Glass Co. 47
Ozalid Products Div., General Aniline & Film Corp. 7

Parsons Bridge Co. 84
Pioneer Engineering Works 93

Raymond Concrete Pile Corp. ..... 3rd cover
Rogers Bros. Corp. 62
Rogers Iron Works Co. 98

Sauerman Bros., Inc. 91
Smith Co., S. Morgan 22
Sprague & Henwood, Inc. 72
Staedtler, Inc., J. S. 48
Stemco Corp. 4

Timber Engineering Co. 65
Timken Roller Bearing Co. ..... 4th cover

Union Wire Rope Corp. ..... 12 & 13
Unit Crane & Shovel Corp. 64
U. S. Steel Subsidiaries ..... 94 & 95

Waver Impactor Sales Co. 46
Wellman Engineering Co. 63
White & McGill, Inc. 72
Winslow Scale Co. 91
Wisconsin Motors Corp. 62

Yeomans Bros. Co. 61

SEARCHLIGHT SECTION

(Classified Advertising)

Employment
Positions Vacant 81
Selling Opportunities Offered 81
Positions Wanted 81
Part Time Work 81
Selling Opportunities Wanted 81
Employment Services 81

Special Services
Contract Work 81

Educational
Schools 81

Business Opportunities
Offered 81

Notices
Proposal 76-80

Equipment
(Used or Surplus New)
For Rent 84
For Sale 82-85
Piling 84
Rail 84
Surveying Instruments 82

Wanted
Equipment 82

ENGINEERING NEWS-RECORD

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Letter from WINNIPEG

STAND BY TO BLAST—Canadian Engineer Corps troops, left, place demolition charges on the roof of a house lodged against Winnipeg's Elm Park bridge. The blast, right, was designed to relieve pressure on the bridge. (Acme Photos)

With flood waters swirling around them at record heights, Winnipeg's citizens have been too busy for more than a month to worry much about what might have been done to avoid the flood.

But elsewhere in the Dominion, other Canadians have paused long enough in the general Winnipeg relief effort to study ancient reports of floods and surveys. One carries a 70-year-old warning.

It is futile," this report declared flatly, "to assume that the Red River shall never again overflow its banks. Man is utterly powerless to prevent this occurring periodically, and whenever it occurs, the disastrous consequences will be intensified in proportion to the increased numbers of inhabitants within the submerged districts."

The sage who called this shot so far back over the years was Sir Sandford Fleming, one of the greatest figures in Canadian engineering. Founder of the standard times zones, Sir Sandford is spoken of as one of the greatest pioneer railroad engineers. He made the original surveys for the Canadian Pacific Railway, and it was in his report to the Canadian government on this assignment, printed in 1880, that he made his prediction.

Sir Sandford's report suggested the railroad cross the Red River at Lower Fort Garry, about 20 miles downstream, where the banks recede and allow ample space for the passage of flood water. That his advice wasn't accepted may give Winnipeg a bitter pill to swallow. Winnipeg grew at the site of the CPR's crossing point.

• **Eyes front**—But even as the water lingered within a tenth of a foot of its record height (50.3 ft above datum), Canada's emphasis on the Winnipeg flood was forward, toward the rebuilding, not backward to what might have been.

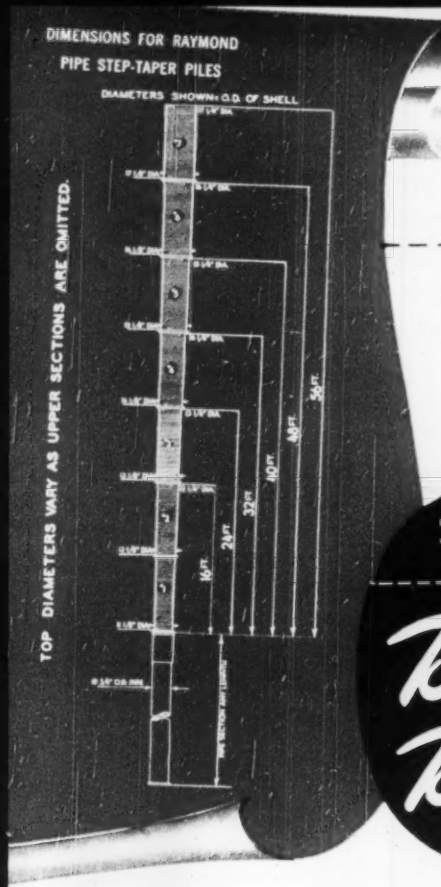
The Manitoba provincial government, for instance, is reported to be studying a plan for a $40,000,000 floodway to divert water around the city in the event of a similar catastrophe. Manitoba's Premier Campbell has announced that this appears to be one of the few practical plans. It entails a floodway east of the city from the Red River at St. Norbert, 10 miles south, to Natal, 10 miles north of the city and about halfway between Winnipeg and Lake Winnipeg. This would remove some water from the Red River before new floods are poured into it by the Assiniboine, which flows directly into the Red from the West right in Winnipeg.

Such a floodway, it is claimed, would obviate the necessity of building dikes in Winnipeg proper. But it would do nothing for areas contiguous to the river between Emerson, at the International Border, and Winnipeg. For much of the 70-odd miles lying between the cities, the Red River has become a lake as much as 10 miles wide. Over 600 sq mi of fertile farmland in this area remained under water in the fifth week.

And, of course, at the height of a disaster, long range plans for prevention of a recurrence often ring more or less hollowly. The immediate effort must be for the relief and protection of those whose lives and fortunes are at stake. Whatever ultimate aids may be done to guard Winnipeg from future floods, it's evident as early as this that government officials are aware of the need, for government has been severely criticized in the press.

• **They didn't fail**—Engineers who are responsible for the works protecting the city can take pride in the fact that no major dikes had failed, a month after the flood hit the city. The municipal engineers have done their jobs equally well. As the flood's fifth week opened and the first signs of respite could be seen in dropping water levels south of the border, City Engineer W. D. Hurst and his staff (all local engineers were registered) for emergency service) had been able to preserve all municipal services. This had been possible, to be sure, only because of emergency equipment which had been flown and railed into Winnipeg from other Canadian cities. But it had been done, and it made unusual reading for citizens who are accustomed to disaster stories of darkened cities without communication.

• **Who's to pay?**—Even before anyone knows what the bill will be, there's some very high level activity regarding how it shall be paid. A joint Dominion-Provincial commission has been established to investigate the allocation of flood damage costs between governments. It's to report "at the earliest possible moment," and its assignment is purely financial. Because the commission is thus limited, Ottawa anticipates further negotiations toward a federal-provincial rehabilitation program. Judging from the comparable performance at the time of the Fraser River Valley floods, in 1948, the prospect is for a 75-25 split between the Dominion and Manitoba governments.



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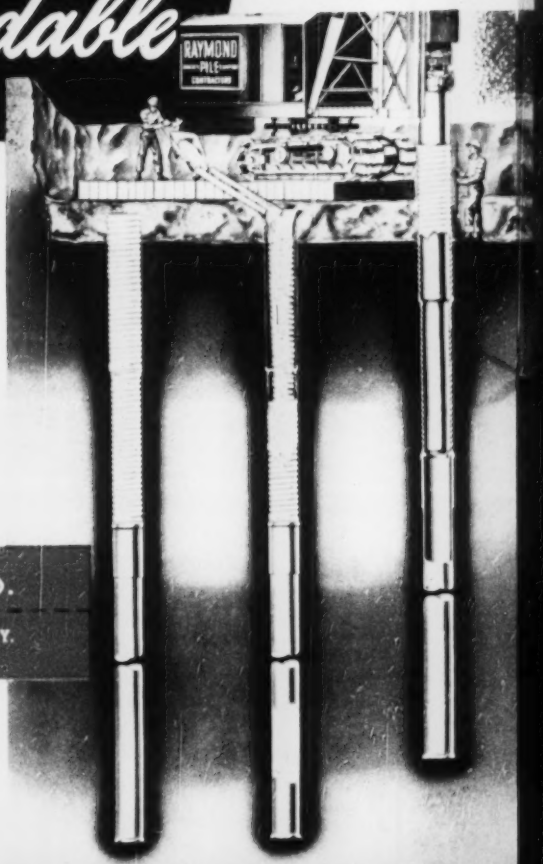
4. COMPOSITE . . . 5. GOW CAISSONS

Raymond installs every type of pile: cast-in-place concrete, pre-cast concrete, steel pipe, wood and H-beam. Raymond operations include underpinning, borings and soil investigations, waterfront construction and harbor and river improvements; also cement mortar lining of pipes by the Centriline Corporation, a Raymond Subsidiary.

3. PIPE STEP-TAPER PILES

Deep and Dependable



Raymond Pipe Step-Taper Piles are composed of an upper section of Step-Taper Shell Pile and a lower section of closed end steel pipe pile. These piles are generally used to penetrate thick beds of soft soil to reach hard bottom at depths as great as 150 feet or more. The pipe step-taper pile is a most dependable pile available for reaching hard ground at great depths.

Raymond's methods result in efficiencies and substantial savings that are well worth investigating. Consult our engineers for more detailed information.

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New Lorain-50 "Series" revolves on new TIMKEN® cone rollers

FOUR cone rollers in the new Lorain-50 "Series" of power shovels and cranes carry the weight of the entire upper structure including the bucket load.

The cone rollers are a new development of the Timken Company and assure a free, easy swing when the turntable revolves. Each cone roller is a complete Timken® tapered roller bearing—with inner races, rolls, cages, and outer race. It is the cone-shaped outer race of the Timken bearing itself upon which the turntable revolves. And like conventional Timken tapered roller bearings, the cone rollers take radial and thrust loads, have extra load carrying capacity and keep maintenance to a minimum.

Timken bearings take any combination of radial and thrust loads because of their tapered design. Line contact between rolls and races gives extra load-carrying capacity. And thanks to their true rolling motion and incredibly smooth surface finish, Timken bearings virtually eliminate friction. Shafts are held in positive alignment, reducing wear on surrounding parts.

Normally, Timken bearings last the life of the machine because they are (1) engineered for the job, (2) are made of Timken fine alloy steel, (3) are precision manufactured.

No other bearing offers *all* the advantages you get with Timken bearings. They have more than fifty years of bearing research and development behind them. Insist on Timken bearings in the machines you buy or build. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address, "TIMROSCO".

The symbol on a product means its bearings are the best.

THEW SHOVEL COMPANY, *Lorain, Ohio, uses Timken cone rollers to insure long life and trouble-free performance in the swing mechanism of their Lorain-50 "Series" shovels. Notice the cone roller and bearing are integral, the roller itself serving as the outer race of the bearing.*

WE MAKE OUR OWN STEEL

The special grade alloy steel which gives Timken bearings their strength and resistance to wear, is made in our own steel mills.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

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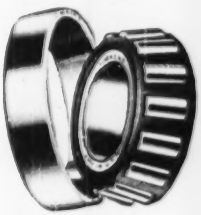

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